N.A.C.A. BULLETIN

In Three Sections

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VOL. XXIX, NO. 11 FEBRUARY 1, 1948

EDITORIAL DEPARTMENT NOTE

It is common knowledge that dollars shrink in terms of goods when inflation is in progress and expand in the same terms when deflation is under way. This is of considerable importance to business enterprises inasmuch as dollars are the basic language in which profitability and financial position are expressed. The absence of a technique for indicating in the books or in either the balance sheet or income statement the profit or loss effect of change in the purchasing power of money permits the assumption, wide of the mark at present and in many past and (doubtless) future periods, that there has been no change. A technique for measurement and disclosure of such change is presented in our first article. The essential simplicity of the proposal may be noted as well as the fact that it avoids the devices of asset revaluation and charge-off of latest costs, which are sometimes advanced as similar correctives.

The article is written by E. STEWART FREEMAN, Company Auditor and Economist, Dennison Manufacturing Co., Framingham, Mass., who has long been active in the Boston Chapter and is a member of the N. A. C. A. Research Committee. Mr. Freeman has addressed two of our National Conferences and has contributed a number of articles to previous issues of the *Bulletin*. In the earlier years of his company, Mr. Freeman organized its sales statistics and factory cost accounting, pioneered in the study of marketing costs, and later had charge of general accounting, budgetary control, and taxes. In the closing days of World War I and the initial postwar period, Mr. Freeman held the post of Assistant Editor of the "Weekly Statistical Report," which summarized for President Wilson the progress of the war and the reconversion to peace.

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It is easy, although it can also be disastrous, to permit some degree of fatalistic thinking to creep in when the subject of inventories is considered. The composition of a company's inventories is the result of so many operating factors—from ordering and purchasing through receiving, processing, storing, and shipping—that almost any lack of coordination among departments or functions may show up in some measure of excessive quantity, unbalance, obsolescence, deterioration, and sheer waste of materials. This situation is the "why" of inventory control and the second article in the present issue is devoted to a review of the means by which, through foresight, a company can apply management to inventories so that, at all stages, they will remain aligned to company plans and purposes and constitute the least possible financial hazard.

THOMAS B. NOBLE, Assistant Treasurer, Stockham Pipe Fittings Co., Birmingham, Ala., is the author of this article. Mr. Noble is immediate Past President of the Birmingham Chapter and a recent *Bulletin* contributor. Prior to his present connection, Mr. Noble, who is a Certified Public Accountant of Alabama, was associated with Ernst & Ernst, in Birmingham, in the practice of public accounting.

This *Bulletin* is published semimonthly by the National Association of Cost Accountants, 35 Madison Ave., New York 17, N. Y. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter, August 28, 1925, under the Act of March 3, 1879.

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FEBRUARY 1, 1948

CAPITAL PRICE ADJUSTMENT METHOD FOR DEFLATING INFLATED PROFITS

by E. STEWART FREEMAN,
Company Auditor and Economist, Dennison Manufacturing Co., Framingham, Mass.

The depreciation of the dollar should not be misrepresented as a gain in real wealth. Inflation is a form of taxation for which allowance should be made out of income. The purchasing power of the capital fund must be maintained before any additional dollars can be counted as profit.

Measuring Profits with Shrinking Dollars

When it takes more dollars to measure our wealth that can mean either that we are worth more or that the dollars are worth less. When the value of the dollar remains the same, a gain in dollars is a real profit. If, however, the dollars decline in value faster than they increase in number, the result should be called not a profit but a loss.

While the dollar is a useful and necessary common denominator and medium of exchange for current transactions, the following table shows that it has not been a very reliable standard for comparing values over a series of years.

RELATIVE WHOLESALE PRICES OF "ALL COMMODITIES"

Bureau of Labor Statistics Averages based on 1926 as 100

1808	79	1857	76	1920	154
1814	125	1861	61	1922	97
1834	61	1864	132	1929	95
1839	77	1879	61	1932	65
1843	52	1882	74	1937	86
1847	62	1896	46	1939	77
1848	56	1913	70	1947	153 August

Today we can see some factors making for lower and others for higher prices, but it is hard to see any signs of a stabilized horizontal price level. Some reduction in prices should be expected as productive capacity, the supply of commodities, and competition increases and as costs are reduced by the accelerated progress

of technology. However, this reduction is likely to be retarded and perhaps at times offset by factors making for higher dollar prices. Among these are the large increase in the supply of money, continued government spending, foreign loans, farm price supports, a tax system which increases costs and reduces the incentive to invest, and organized efforts to raise dollar wages faster than the output of labor. In the future, as in the past, the dollar is more likely to fluctuate in value than to become a reliable measuring stick.

No competent surveyor would neglect to check his tape and make due allowance for any variation in its length. While accountants have not been unaware of a similar need, they have not yet been able to agree among themselves as to what should be done. Consequently, they seldom attempt to distinguish between the stretching or shrinking of their standard of measurement and changes in the size of the things they are trying to measure. For that reason, real profits are usually overstated when the value of the dollar is declining and understated when it is rising.

Approaches to More Scientific Measurement

Changes in the purchasing power of the dollar received greater recognition when more emphasis was placed on balance sheet values. However, the periodic revaluation of the assets did not provide a satisfactory measure of profits. When prices were rising there was a tendency to pad the profits with unrealized appreciation; no offsetting allowance was made for the depletion of the cash account which would occur when the assets would have to be replaced at the higher price level; nor was any allowance made for the additional dollars which would be required to finance the excess of accounts receivable and bank balances over accounts payable.

A more recent effort to eliminate the effect of changing prices produced the last-in, first-out or "lifo" inventory method. Its emphasis has been on the matching of current costs with current income. When inventories are replaced at higher costs, this method eliminates the increase from the assets and charges it against current income. If prices merely fluctuated up and down, lifo might serve to reduce the amount of variation in the profits. When, however, prices move to a higher level of indefinite duration, the inventory is only one of the asset items which require more capital. Thus, at its best, lifo is inadequate.

Also, even in respect to inventories, the philosophy of lifo is vulnerable. It seems to assume that replacements are the result of past sales, whereas the only real justification for replacements is the need of the goods for future sales. Thus the regular lifo method is better adapted for concerns handling basic raw materials, which are almost always replaced in kind, than for concerns handling a wide variety of products subject to obsolescence and substitution.

A step beyond lifo is a modification of the retail method of pricing inventories which has recently been approved for tax purposes (Hutzler Bros. Co. 8 TC No. 3 January, 1947). Under this modification the opening and closing inventories are compared by means of price indexes for the purpose of estimating the extent of any increase in physical volume. This permits the lifo principle to be applied to retail store inventories and it furnishes an opening for advocating the use of price indexes for other kinds of business and for other classes of assets.

Neither the revaluation method nor the lifo method can be accepted as a really scientific method of measurement. The revaluation method seeks better results for the balance sheet, but tends to distort the profits. The lifo method, on the other hand, seeks a better computation of profits, at least in respect to inventories, but it does not give a true picture for the balance sheet. Thus each, in its attempt to correct one evil, tends to create another. Also, both concentrate their attention on only part of the assets and ignore the other parts. Neither pays any attention to the changes in the value of the assets and liabilities which consist of money and rights to money.

The purpose of this paper is to propose a third and different type of approach to this problem. While the first adjusts the assets by distorting the profits and the second adjusts the profits by distorting the assets, this third method will adjust the profits by an offsetting adjustment of capital. Hence it will be called the capital price adjustment method.

This proposed method will emphasize the need of maintaining the purchasing power of the capital fund and the fact that there can be no gain in real wealth until after this has been done. As the dollars previously contributed to capital decline in purchasing power, the proposed method will result in the transfor of sufficient dollars from income to capital to offset this decline. When prices go up, the increased investment in assets will be shown but this in-

crease will be offset by additions to capital supplied from income. Thus, in effect, the profits will be computed by comparing current costs with current income.

What Happens When Prices Rise

When prices go up, the assets which consist of money and rights to money depreciate in purchasing power. Other assets appreciate in dollar value, but when the specific assets then on hand are converted into money or rights to money this appreciation is ended. Then, as replacements are made at the higher cost, more money must be spent, resulting in depletion of the cash account. Thus, almost the whole of the capital will in time suffer from depreciation or depletion.

When materials, machines, and other assets are bought at one price level and the goods made therefrom or therewith are sold at a higher price level, there is a real gain in dollars, which can properly be described as appreciation. The opportunity for this gain may be said to arise from the saving in cost made by having the goods in inventory or the equipment in use instead of buying them currently.

This gain, however, is merely potential; it is realized only as selling prices are increased. If the selling price of goods going out of inventory is increased precisely at the same time and by the same percentage as the cost of goods going into inventory this potential profit may in fact be realized. However, many factors, such as OPA, contracts, modal prices, and the timing of price decisions, may interfere with this perfect synchronization of cost and selling price. The balance between supply and demand may not be the same in the market where the sales are being made as in the market where the costs are being incurred. Competitors may have even larger inventories of low-cost goods. Thus the difference in cost may not be a very reliable measure of the actual profit contributed by inventory appreciation.

Whatever appreciation has been realized during any year will have been on the sale of the lower-cost goods prior to the closing inventory. Except as the increase of cost was anticipated in the selling price of such lower-cost goods, this appreciation will in no way be related to the existence of the higher cost goods in the closing inventory. The closing inventory will be related instead to the sales of following year.

If the inventory had previously been written down to a market value which was less than cost, a rise in cost might permit the cancellation of such depreciation. No inventory that is priced at cost, however, can ever include any appreciation. While an increase of selling price is a gain, an increase of cost is always and necessarily a loss.

When materials, machines, and other assets are replaced at a higher price, the number of dollars in the bank account will be reduced and the number of dollars invested in materials, machines, and such other assets will be increased by precisely the same amount. As the total net assets will therefore be the same after as before the replacement, there will be nothing in the transaction that can properly be called appreciation. Inasmuch as the physical assets will merely have been replaced in kind whereas the cash account will have been depleted, it would be more accurate to class such transactions as monetary depreciation.

This monetary depreciation will not be confined to the depletion of cash caused by the replacement of physical assets. Accounts receivable, accounts payable (negatively), and the working balances in the bank accounts will have to be replaced by larger amounts as the purchasing power of the dollar declines.

Thus, whatever gain is made from the sale or use of lower-cost assets will not all be available for taxes, dividends, wages, betterments, or expansion. At least part, and perhaps all and more, will be needed merely to supply the additional dollar capital required to carry on the pre-existing physical volume of business at the higher price level.

Inflation is a Form of Taxation

If, for example, the general price level goes up fifty per cent, the average business will sooner or later need nearly fifty per cent more dollar capital in order to carry on the physical volume of business which it was capable of carrying on before. For the working capital the increase will be needed currently, while for other items only part need be supplied at once and the remainder can be supplied in instalments. Assets, such as land and good will, which both appreciate with the price level and retain their value indefinitely, will be the only items not affected.

This additional capital will be needed regardless of whether or not specific assets are replaced in kind. Its purpose is not to provide for the precise duplication of the past but rather to maintain

the general financial capacity of the business to serve the future as well at the higher price level as it could have served it had prices remained unchanged.

Increased efficiency may, of course, reduce the future need for capital, even as it can offset increases in taxes, and, in one case as in the other, necessity may be the mother of invention. It is not customary, however, to ignore increases in taxes or other costs merely because we may later find a way to offset them. Even though the losses may spur us to make the gains, they are not any necessary part of the gains. If, as, and when the offsetting savings in capital are realized by the company or distributed to the stockholders, they will buy less for either at the higher than at the lower price level. The rise in prices, therefore, affects the capital that can be spared as well as the capital that is a minimum necessity. It affects everything that is owned.

If this additional dollar capital is not provided, the physical volume of business will in time have to be curtailed by nearly one-third. If it is provided by outsiders, it will have to work for the people who contributed it. Thus either the dollars must be provided out of income or nearly one-third of the physical capacity of the business will be lost by the existing stockholders.

Thus, monetary inflation is a form of taxation. It is a levy on capital and as such is merely a substitute for a levy on income. Theoretically, the war could have been financed either by inflation or by the more orthodox forms of taxation. Actually it was financed by a combination of the two. There is no sufficient reason why accountants should carefully make an allowance for the tax on income and completely ignore the tax on capital. There can be no real profit until adequate allowances have been made for both.

When, on the other hand, the general price level declines, the purchasing power of capital is increased. When the decline comes as the result of greater efficiency, this increase is a form of social dividend. When the decline comes as the result of shrinking market demand, the increase is at least some offset to the losses resulting therefrom. Hence, an increase in the purchasing power of capital warrants a credit to profits similar to that from a tax carry-back or refund.

Capital Price Adjustment Method

The capital price adjustment method advocated herein is based on two propositions; first, that the accounts must necessarily be

kept in dollars, and second, that when prices rise more dollars must be reinvested in the business to maintain the purchasing power of the capital fund.

When the assets increase in dollars, consistency requires that this increase be shown. Otherwise, the relationship between the asset figures and other figures, such as sales and profits, will be distorted.

On the other hand, we should recognize in the accounts that this increase in asset dollars is only part of the story. There is also the fact that more dollars must be added to capital if the company is to maintain the existing physical volume of business. Therefore, we should complete the job by showing in the capital accounts this offset to the increase of asset dollars. It is neither fair nor correct to count only the favorable aspects of an increase of price without counting also the unfavorable.

Under the capital adjustment method, the procedure would be first to price the assets and figure the profits in dollars and then to transfer sufficient dollars from profits to capital to offset the shrinkage in the purchasing power of the capital.

For example, if prices go up fifty per cent, an additional amount of working capital equal to fifty per cent of the net current assets would be required almost immediately, and this amount would be deducted from profits and added to capital. If, instead, prices go down twenty per cent, an amount equal to twenty per cent of the net current assets would be released from capital to profits.

If prices stay on the fifty per cent higher level, additional dollar capital would in time be needed to replace assets other than current assets. Depreciation based on original cost would need to be supplemented currently by an amount equal to fifty per cent of the accumulated reserve and annually thereafter by an amount equal to fifty per cent of the current depreciation credit to the reserve.

The amount to be transferred from profit and loss to capital could be determined by one or more indexes of the purchasing power of capital in the field or fields in which the capital of the company is customarily employed. This method would be simpler and also more logical than the item-by-item repricing or revaluation of specific assets in which, more or less by chance, the capital happens to be employed at the time the change in the price level occurs. Also it is the only practical method of providing the capital for the necessary additional investment in the assets which consist of money and rights to money.

This allowance for depreciation in purchasing power of capital would be credited to a capital price adjustment account and deducted at the bottom of the profit and loss statement in somewhat the same way as, but separately from, the income tax.

If subsequently prices go down the entries would be reversed and the amount released by appreciation in the purchasing power of capital would be debited to the capital price adjustment account and added at the bottom of the profit and loss statement, in somewhat the same way as an income tax carry-back or refund.

Any credit balance in the capital price adjustment account would be added on the balance sheet as one more item of capital and surplus. In some jurisdictions this item might be classed as a surplus reserve, in some as capital surplus, and in others with the surplus transferred to capital at the time of a no-par-value stock dividend. It would in all cases differ from appreciation surplus, because it would reflect the actual investment of money and not a mere write-up of assets to an amount above cost.

Any debit balance in the amount would be deducted from the sum of the other capital and surplus items.

In this way the assets would be priced at the most recently invested dollars, the purchasing power of the capital fund would be maintained, and the profits would in effect be measured by matching current costs against current income.

Price Adjustment for Working Capital

Working capital is required for two kinds of net current assets, as follows:

1. Net money and money rights, e.g.: current cash balances, plus trade receivables, minus trade payables and short-term bank loans (but probably not minus income tax or dividend payables, because, when these items appear on the opening balance sheet, they are related to the liquidation of the preceding year rather than to the working capital of the current year),
2. Prepaid current costs, e.g.: current inventories and current prepaid expense.

As inventories are replaced and prepaid expenses are renewed at the higher price level, dollars flow from item 1 to item 2.

Yet item 1 also requires an increase of capital. When the price level rises the flow of money required to finance any given physical

volume of business will be increased proportionately. As the level of prices does not of itself have any effect on the rate of turnover, any cross section of the flow will show a similar increase. For example, a fifty per cent increase in the price level would mean that fifty per cent more capital would have to be invested in the excess of cash, bank accounts, and receivables over payables.

Consequently the working capital must be increased to cover not only the drain from item 1 to item 2 but also the increased need of capital for item 1. This is an aspect of the problem which has received very little attention. Probably that is because all eyes have been focused on the valuation of the assets, when they should have been watching the purchasing power of capital.

The increased need for working capital will therefore be equal to that percentage of the net current assets (as defined for this purpose) at the beginning of the year by which prices rise during the year. For example, if the net current assets amount to $4,000,000 and prices rise twenty-five per cent, $5,000,000 will be required at the end of the year. This would mean that the profits of the year would have to contribute $1,000,000 to the capital price adjustment account.

If, instead, prices had declined twenty per cent the capital price adjustment account would have restored $800,000 to profits.

Price Indexes for Working Capital

Various ways of computing the percentage of change in price are possible.

One way would be to figure the percentage separately for each item. The opening inventory might be priced with the unit prices used for the closing inventory. Then the percentage by which the aggregate cost of the opening inventory as thus computed exceeds the cost as originally computed, would be the figure to use for capital price adjustment for inventory. The percentage for prepaid expenses could be figured in the same way. The average percentage of increase in selling price during the year could be used for accounts receivable. The percentage as figured for the various items for which money is owed could be used for current liabilities and perhaps also for the cash balances.

Another way would be to use a composite index for the total net current assets. This composite could be made up from indexes for the several parts but these parts would be weighted according to their normal relation over an extended period rather than ac-

cording to the more or less accidental distribution at the beginning of the specific year. The weighting, for example, might be based on a ten-year average of balance sheet percentages, with perhaps some allowance for any discernible trend of change in the relation of any of the items to the total.

Almost any reasonable method, consistently followed, would be a great improvement over the customary practice of completely ignoring all effects of the change in prices.

How Durable Assets are Affected

When a machine or other durable asset has been acquired at a price level lower than that at which its product is being sold, there is a potential gain equal to the amount of depreciation saved thereby. Except for the time element, the result is much the same as in the case of merchandise. In the one case, as in the other, any gain in dollars realized in this way is likely to be at least offset by the need of additional dollars to provide for the increased cost of replacement.

When there is a horizontal price level, the depreciation reserves serve to maintain the capital required for replacements and the accumulated profits are available for betterments and expansion. After a rise to a fifty per cent higher price level, however, the normal depreciation reserves would provide for only two-thirds of the cost of physical replacements. Hence, under orthodox accounting methods, the accumulated profits would have to provide for the other third of the cost of replacements as well as for betterments and expansion. Thus, a lot more of what is called profit would have to be added to what is called depreciation if the same rate of physical expansion is to be maintained.

The need for additional dollar capital under such conditions would eventually equal fifty per cent of the gross asset cost and not merely fifty per cent of the net investment. Thus, it would be necessary not only to step up future savings for replacement but also to make up for the shrinkage in the purchasing power of the reserve accumulated from past savings.

The last-in, first-out, or lifo method could be applied to durable assets as well as to current inventory. If lifo is the answer in one case it should also be the answer in the other. Under this method the earliest purchased asset of each kind would remain continuously on the books and all differences between replacement cost and such earliest cost would be reflected by a decrease or in-

crease of profit. Presumably the depreciation charge would then be used to build up a fund for replacements and all differences between the accumulated reserve and the actual replacement cost would be adjusted to profit and loss prior to or at the time of replacement.

As many durable assets would not be replaced in kind, this lifo method would involve some complications but not necessarily more than are involved when new products are substituted for old ones in current inventories. Also the figures carried on the balance sheet would in time bear little or no relation to either current replacement cost or current value. Although this lack of relation is always greater in the case of durable assets than in the case of merchandise inventories, it would hardly be a reason for rejecting lifo for the one if it is accepted for the other.

Price Adjustment for Durable Assets

Under the capital price adjustment method advocated herein, the figures on the balance sheet and profit and loss statement would be the same as under orthodox accounting except for the transfer of dollars between profits and capital. As the assets would be priced at the most recently invested dollars, there would be no asset write-up on the balance sheet as was advocated by many in the 1920's. At the time of replacement, however, the higher cost of the new assets would be substituted for the lower cost of the discarded assets.

The original cost of the existing assets would be recovered through depreciation charges credited to the depreciation reserve. The additional dollar capital required to replace the assets at a higher price level would be recovered through a surcharge credited to a reserve price adjustment account. As the discarded assets are charged to the depreciation reserve, an amount reflecting the increase of cost would be charged to the reserve price adjustment account and credited to the capital price adjustment account. Thus, at the time of replacement, the increase in the asset account would be offset by the increase in capital.

As the assets would not be changed in price on the books except as they are replaced, only the regular depreciation reserve, based on original cost, would be deducted from the assets. Any credit balance in the reserve price adjustment account would either be added to the capital price adjustment account or be shown sepa-

rately among the capital and surplus items on the balance sheet. Any debit balance would be treated like a debit balance in the capital price adjustment account.

Just how far the depreciation surcharge should be allocated in the cost accounting would be a practical question, the answer to which would depend upon the balance between the advantage expected and the expense involved. As the replacement cost of durable assets is not likely to influence competitive pricing, and as the difference in the annual depreciation would be only a small percentage of the selling price, some relatively simple accounting method should suffice.

Price Index for Durable Assets

The percentage of change in price applicable to durable assets could be figured in as much detail as desired, but beyond a certain point further detail would be likely to produce only fictitious precision.

One way would be to divide the assets into a relatively few groups, based on similarity of price movements and length of life, and to compute a set of price indexes for each group as a whole. Thus there might be one set for each of such groups as buildings, machinery, small tools, furniture, and automobiles. The aggregate cost for all the assets in each group could then be allocated according to year of expenditure. The aggregate cost incurred in each year could then be increased by the percentage increase in price from the year of expenditure to the current year. This would give the estimated aggregate replacement cost to compare with the aggregate original cost for each asset group. The percentage by which one exceeds the other could then be used as the percentage increase in the price level.

Price Adjustment of Depreciation Reserves

The following table shows how the reserve price adjustments would be made. It is based on three arbitrary assumptions: (1) that for assets on hand prices have increased fifty per cent to the beginning and sixty per cent to the end of the year, (2) that for the older assets discarded during the year the replacement cost is seventy-five per cent higher than the original cost, and (3) that no previous replacements have been made at a price higher than original cost.

Item	Durable asset account (A)	Capital price adjustment account (B)	Depreciation reserve account (C)	Reserve price adjustment account (D)	Per cent of col. (D) to col. (C) (E)
Balance at beginning of year	$18,000	0	$8,000	$4,000	50
Discards during year					
Cost	2,000	1,500	2,000	1,500	75
Salvage	175		175	—	
Salvage transfer	—		75	75	
Salvage after transfer	—		100	75	75
Balance of cost	1,825		1,900	1,425	75
Remainder	16,000	1,500	6,100	2,575	42.2
Add from Profit and Loss					
Adjustment to year-end price level				1,085	17.8
Depreciation for year			2,000	1,200	60
Total from Profit and Loss				2,285	
Replacements and substitutions	3,500	—			
Additions and betterments	—	—			
Bal. at end of year	$19,500	$1,500	$8,100	$4,860	60

At the end of each year, the reserve price adjustment account would be revised to that percentage of the depreciation reserve by which the current price level has changed since the weighted average year of purchase of the assets then on hand. In the table above it has been assumed that prices have increased fifty per cent to the beginning and sixty per cent to the end of the year. Hence, the reserve price adjustment account would show credit balances equal to fifty per cent of the $8,000 depreciation reserve at the beginning of the year, and to sixty per cent of the $8,100 depreciation reserve at the end of the year.

If prices had gone down instead of up since the time of purchase, the same principle would have been followed but the reserve price adjustment account would then have shown a debit instead of a credit balance.

When assets are discarded, the original cost would be credited to the asset account and, subject to credit for salvage, debited to the depreciation reserve. Any excess of replacement cost over

original cost would be credited to the capital price adjustment account and debited to the reserve price adjustment account. Thus, the amount added to the assets at the time of replacement would have been provided by an offsetting amount added to capital. If, instead, the replacement cost is less than the original cost, the capital price adjustment account would be debited and the reserve price adjustment account would be credited with the dollar saving. Thence the savings would be passed on to profits when the reserve price adjustment account is revised at the end of the year.

The rise in the price level should increase the salvage as well as the cost of replacement and the gain on the one should be offset against the loss on the other. Thus, perhaps at the end of the year, the credit for salvage should be split, $100 to the depreciation reserve and $75 to the reserve price adjustment. This would increase the net debit to the reserve from $1,825 to $1,900 and reduce the debit to the price adjustment account from $1,500 to $1,425, which is seventy-five per cent of the $1,900.

The discard of the older assets would be likely to change the weighted average year of purchase of the assets on hand. Thus, if the trend of prices has been upward, the increase in price would be likely to be less for the remaining assets than for the discarded assets. In the table above, the effect of this is to reduce the price increase from fifty per cent before the discard to 42.2 per cent after the discard.

As the increase in price to the end of the year has been assumed to be sixty per cent, the income for the year would have to contribute enough to build this 42.2 up to sixty per cent as well as the sixty per cent of the current depreciation.

Planning for Replacements

These entries would tend to withhold from gross income amounts sufficient to provide for the replacement cost of the existing assets instead of amounts serving primarily to amortize the original cost. No method of reserve accounting, however, will of itself warrant that the cash so withheld will be available when needed. Amounts deducted from profits and added to reserves are withheld from dividends but in other respects they are no different from amounts which are labeled as profits and added to surplus. Unless the money is invested in a segregated replacement fund (an asset), it can be and commonly is used for the expansion of the business. If the business is growing and replacements

are fairly regular, this is in fact likely to be the most efficient way of using the reserves.

The provision of money for replacement, as well as for expansion, is a function of long-range financial planning or budgeting, and this planning has no necessary relation to the method used in computing profit. The capital price adjustment plan is proposed not for the sake of providing money for replacement but for the purpose of providing a more realistic statement of what is called profit and taxed as net income. Nevertheless it should serve to emphasize the amount which needs to be saved and to that extent it should help in providing the funds.

Price Adjustment of Other Assets and Liabilities

The capital price adjustment method applies to all assets and liabilities which are acquired or incurred with dollars of one kind of purchasing power and sold for or liquidated with dollars of different purchasing power. Ordinarily the credit or debit to the capital price adjustment account should be made at the time of the reconversion to dollars of a different purchasing power. In the case of net current assets, it has been assumed that the reconversion is made currently. In the case of durable assets, the charging off of the discarded asset against the reserve has been taken as the time for completing the adjustment. In the case of other assets and liabilities, similar principles should apply, as explained in the following paragraphs.

If, for example, land or shares of stock are sold at a price level fifty per cent higher than that at which they were bought, an amount equal to fifty per cent of the original cost would be charged against the resultant profit or loss and credited to the capital price adjustment account. This would have the effect of translating the cost, and therefore the profit or loss on the sale, into terms of current dollars.

If the assets sold reflect the normal employment of the company's capital, a specific price index could be used in making this adjustment. For example, if a plant site is sold for the purpose of buying another plant site, a price index of factory land might be used. Otherwise, and especially in the case of investments outside of the business, a more general index of the purchasing power of the company's capital would be preferable. For example, if the assets represent a temporary investment of funds to be used later for working capital, the adjustment might be made on the basis

of the same indexes as are used for the working capital itself. The idea would be not to cancel the profits or losses due to the degree of wisdom, skill, or experience exercised by financial or operating management, but merely to eliminate the effect of the change in the value of the dollar itself.

Investments in long-term receivables, bonds, etc., result in a loss of real purchasing power when the price level is rising and a gain when it is declining. Long-term payables work the other way, and produce a gain of real purchasing when the price level is rising and a loss when it is declining. While it is not possible during the intervening years to be sure what the price level will be at the time of maturity, conservatism would seem to require at least some anticipation of expected losses. A good plan might be to offset the expected long-term gains in purchasing power against the expected long-term losses. Then, if the net balance is a credit to profits, defer it until it is realized. If, on the other hand, it is a debit, re-estimate the amount each year, divide it by the number of years to maturity, and charge the quotient against the current year.

Starting the Capital Price Adjustment Method

The theoretically ideal way to start the capital price adjustment method would be to adjust each segment of the capital and surplus to the purchasing power that it had when it was contributed.

Events which have gone over the dam, such as taxes, dividends, quasi-reorganizations, and changes in ownership might, however, make it impractical to change past computations of profit, surplus, and capital. Thus many companies might prefer to choose a more or less arbitrary starting point, as was the practice when the last-in, first-out inventory method was adopted.

In such cases, replacements made before the starting date would have to be disregarded. Working capital contributed prior to the starting date would have its purchasing power maintained as at that date, and working capital added thereafter would have its maintained as it was when added. Replacements of noncurrent assets prior to the starting date would be ignored, but, each year after the starting date, the then-existing balance of the depreciation reserve would be adjusted to compare with the replacement cost of the depreciable assets then on hand.

Part of the capital price adjustment account would therefore represent an adjustment of the capital contributed directly by the

stockholders and part an adjustment of the reinvested earnings of prior years. The account could be divided into these two parts if there is any local tax or other legal need for doing so, but probably this would seldom be necessary.

How Profits Would Be Affected

The effect of the capital price adjustment method on profits may be easier to understand if we assume an oversimplification in which all prices start at one level and move by the same percentage to another level, each of indefinite duration. Between these two levels there would be two periods of change, in one of which the net current assets would be replaced and in the other the durable assets. Thus there would be four periods, as follows:

1. The initial lower price level.
2. The period of changing prices, in which the net current assets would be replaced.
3. The remainder of the life of the durable assets bought before the change in the price level was completed.
4. The final period, which would be affected only by costs incurred at the higher price level.

In the fourth period, if other factors remain equal, the percentage of profit to sales would be the same as in the first period but every item would have changed by the same percentage as the price level. On account of the long life of some durable assets this period might be postponed indefinitely, but usually it should be approximated within about ten years after the new price level is first reached.

The third period would differ from the fourth period principally to the extent that it would have a depreciation charge based on purchases of durable assets at an earlier price level. The capital price adjustment method would eliminate this advantage or disadvantage by the transfer between profits and the reserve price adjustment account, thus in effect adjusting the depreciation to a replacement-cost basis.

Method Reduces Reported Profits When Prices Are Rising

The second period of changing prices would be the one in which the profits would be changed most by the capital adjustment method. The extent of this change would vary with the ratio of

capital employed to sales and profits and with the rate of the change in price. For example, the larger the capital in relation to normal profits, the greater would be the effect on profits of any shrinkage in its purchasing power. Likewise, the more rapid the rise in price, the less opportunity there would be to provide for such shrinkage out of current profits.

The first column of the following table shows the percentage of capital employed to sales for an imaginary company. The other columns illustrate how much additional capital would be needed by this company when the price level goes up.

Per cent of average annual sales

Item	*Capital employed before rise of price*	*Additional capital required if prices rise:* 10%	20%	50%
Inventories	16	1.6	3.2	8.0
Other net current assets	10	1.0	2.0	5.0
Net current assets	26			
Durable assets	40			
Depreciation reserve	16	1.6	3.2	8.0
Net durable assets	24			
Total invested capital	50			
Needed currently		4.2	8.4	21.0
Needed over remaining life of durable assets		2.4	4.8	12.0
Total		6.6	13.2	33.0
Annual depreciation	4	0.4	0.8	2.0

To the extent that selling prices are increased before the lower-cost goods in inventories are used up, the resulting inventory profits should supply at least part of the increased capital required for inventories. The lifo method would accomplish this result by eliminating the year's increase of cost from the closing inventory. The capital price adjustment method would price the closing inventory at the higher cost but would offset the increase by a transfer from profit to capital.

The additional capital required for the remainder of the net current assets and to offset the deficiency in the depreciation reserve would have to be supplied out of other income. A period of rising prices, however, is likely to be (1) a period of rising physical volume, in which many expenses lag behind income, and (2) a period of relatively high sales yield as compared with mar-

keting and manufacturing capacity. Hence, when the rise in price is not too rapid and the tax on fictitious net income is not too high, it may be possible to supply the required additional capital without reducing the profit to less than the average for years of level prices.

In the example above, a ten per cent increase of price during any year would require additional capital equal to 2.6 per cent of sales for assets other than inventory. Even this would involve a substantial reduction of profits for most companies. When the rise in price is more or less than this ten per cent, the reduction of profit would vary accordingly. Also, when the percentage of capital to sales differs from that in the example above, there would be a proportionately different effect on profits. Many companies that appear to be making profits when prices are rising are probably really suffering losses.

Method Increases Reported Profits When Prices Are Declining

When the trend of prices is downward the process would be reversed. The capital released from inventories would help to offset probable losses from reducing selling prices before the higher-cost goods have been sold. The capital released by the other items would help to offset probable losses from (1) the lag in the reduction of expenses behind that of sales, and (2) the low sales yield as compared with manufacturing and marketing capacity.

Thus while the capital price adjustment method is designed primarily to give a truer picture of the changes in real wealth, it would also tend to reduce the amplitude of the fluctuations in profits.

How Dividends Would be Affected

Where dividends follow computed profits closely, or where financial management is inexperienced, this effect on profits is likely to be translated into a similar effect on dividends. On the other hand, where capital requirements are provided out of income by far-sighted financial management, the capital price adjustment method should have relatively little effect on dividend policy.

When prices are rising, cash dividends are more likely to be restricted by the company's need for more dollar capital than by any lack of reported profits. The capital price adjustment method would not change the amount of cash required but would merely shift the labels. It would call the profit the amount left after, instead of the amount left before, the deduction of the additional

dollars required for the maintenance of the purchasing power of the capital. Also it would transfer such addition to an account labeled capital price adjustment, instead of to the one labeled earned surplus.

Concerns that are in the habit of distributing stock dividends and charging them against surplus could issue the same shares and charge them instead against the capital price adjustment account. This, however, would change them from orthodox stock dividends to something more nearly resembling stock split-ups.

When prices are declining, dividends are more likely to be restricted by the reduction of profits than by the lack of cash. As, at such times, the capital adjustment plan would retard the reduction of profits, it might tend also to retard the reduction of dividends. However, future needs for cash would have to be considered as well as current needs. Thus, if prices are expected to go up again, or if the business expects to expand, the temporary change of profit might have little effect on the amount of dividends paid.

The higher the price level, the more dollars the stockholders will need to maintain their standards of living. If, however, such dollars are in effect paid out of capital, the stockholders would merely be misled into overestimating their real incomes. When prices are rising, the capital price adjustment method would avoid the overstatement of the amounts available for dividends, while, over the long run, it should make it easier for dividends to keep pace with the price level.

As, when prices are going up, the proposed method would reduce rather than increase the amount available for dividends, the only legal questions likely to arise at such times would be in connection with dividend obligations or other contracts which are dependent upon earnings. When prices are going down, however, there might also be some question as to the amount legally available for the payment of dividends.

The answers to some of these questions may have to await general acceptance of the method and court recognition thereof. Meanwhile, it would appear that, at least in most jurisdictions, dividends could be paid to the extent of the earned surplus as long as the payment would not reduce the net total of the capital and surplus, including any credit balance in the capital price adjustment account but deducting any debit balance therein, to an amount less than the legal capital.

Use of Method for Tax Purposes

If the capital price adjustment or some similar method should become a generally accepted method of accounting, it should in time be recognized also for tax purposes. It would then reduce taxes when prices are rising and increase them when prices are declining. To the extent that the upward movement of prices is not offset by a downward movement, the capital adjustment method would give a more realistic picture of the income which is available for taxes. To the extent that the upward and downward movements offset each other, it would tend to reduce the fluctuations in taxes and hence in government revenues.

As the law reflects majority rather than advanced thinking, it should be expected to follow rather than to lead in the improvement of accounting conventions. Yet, the experience in connection with the last-in, first-out or lifo inventory method indicates that when there is sufficient demand for a change in accounting, the tax laws can be amended to incorporate the change. Also the decision of the U. S. Tax Court in the Hutzler Bros. Co. case, previously mentioned, paves the way for the use of price indexes in tax administration.

Capital Gains and Losses

If corporations are permitted to use the capital adjustment method for computing taxable income, doubtless individuals will have to be permitted to use it for the computation of long-term capital gains and losses. This, however, is only as it should be.

When prices rise, say eighty per cent, and a practically new house which cost $10,000 is sold for $18,000, the $8,000 difference is called a taxable gain. The Government then takes perhaps one-quarter of this difference, that is, $2,000, and leaves the former owner only $16,000 with which to buy a similar house in a different locality. Yet such a house would cost $18,000. In this way the sophistries of tax accounting can lead to the confiscation by the Government of a substantial percentage of a man's residence. In the absence of other funds, the taxpayer would thereby be forced to reduce his standard of living. Thus, as in the case of business, the present tax accounting results not in a tax on income but rather in a levy on capital.

There might be some argument as to what kind of a price index should be used for adjusting capital gains and losses. In the case

of residences it might be decided that the cost should be increased pro rata with the increase in the average cost of similar houses between the time of purchase and the time of sale. In the case of investments in other than living necessities, however, whether real estate or shares of stock, it might be better to use a general consumer's price (cost of living) index. Almost any method, however, would be better than the present practice of completely ignoring the most important factor in the transaction.

The individual has a real loss also when the price level rises between the time when he buys bonds and the time when the bonds are redeemed. While it might be embarrassing for the Treasury Department to recognize such losses in the case of government bonds, it would be healthy to have the subject debated. The only real solution may be a new kind of bond, the interest and principal of which would vary with the cost of living. While the attempt to make bonds payable in gold proved unsuccessful as against Congressional legislation, there would seem to be nothing to prevent the Congress itself from authorizing any new form of bond. While the dollar is a fairly satisfactory current medium of exchange, it should be possible to devise a better standard for deferred payments.

Possible Influence on Business Cycles

While the capital price adjustment method is aimed primarily at better accounting for economic facts, it may also have some influence on the facts themselves. Many have expressed the opinion that orthodox accounting methods contribute to the swings of the so-called business cycle. The ups and downs of business, however, are influenced more by the cash transactions than by the profit computations of business.

On the upswing, business pays out more cash than it takes in. Purchases are geared to a future sales level which is expected to be higher in both physical volume and price than the one for which current collections are being made. Rising prices and lengthening delivery time induce forward buying and this, together with rising volume and congested facilities, leads to inventory accumulation. Also, at such times, expenditures for plant and equipment are likely to be relatively high as compared with amounts withheld for reserves and surplus.

On the downswing, the movements are reversed and business takes in more cash than it pays out. Purchases are geared to a

future sales level which is expected to be lower in both physical volume and price than the one for which current collections are being made. Five months' supply before the break becomes seven or eight months' supply for the reduced sales, but with improved deliveries three or four months' supply may be adequate. Thus, buying can be deferred while inventories are consumed and prices decline. Inasmuch as, at such times, existing capacity is not fully utilized, expenditures for plant and equipment are likely to be relatively low as compared with amounts withheld for reserves and surplus.

Accounting can do very little about these cash transactions of business except to record the facts as they occur. It has, however, more leeway in respect to the cost and profit computations, which also have some economic influence. Reports of rising profits encourage stock market speculation, stimulate demands for higher wages, and reduce the resistance of management to rising costs, expenses, and dividends. On the other hand, reports of declining profits tend to scare bankers and others into curtailing credits and liquidating investments and business management into slashing costs, expenses, and dividends. Any method which reduces the fluctuations in reported profit should therefore be of at least some help in reducing the amplitude of business cycles.

Possible Influence on Pricing Policy

To the extent that the capital price adjustment method reduces the fluctuation of profits its effect, therefore, should be favorable. If it should go beyond this and establish an inverse fluctuation, there is a chance that it might induce a wider amplitude of price movements. There are, however, factors which should tend to minimize this risk.

The concerns whose profits would be changed the most by this method would also be the ones that would suffer the most from any accentuation of the price movement. They would have a relatively heavy investment and probably be either public utilities, subject to government price control, or members of an industry in which price leadership would be most likely to be influential. Concerns with relatively little investment might have more to gain by rising prices. Their profits, however, would not be changed enough by the capital price adjustment method to influence their pricing policies. Also, they would be the least likely to have any control over the market price of their products.

While some individual concerns might be induced to raise their selling prices more than they otherwise would, others might be influenced to raise them less. Some would expect higher prices to help in maintaining or improving their relative position. Others would realize that higher prices could only hurt business as a whole and that they would necessarily suffer as a part of such whole.

Should Promote Better Understanding

While all the economic and other effects of the capital adjustment method cannot be foreseen, it should be welcomed by the people who believe in truth for truth's sake. It would eliminate one type of fiction from accounting reports. This should help the business community, and hence others, to a better understanding of what actually happens when the price level moves up or down.

Thus, in the longer run, this method should be helpful in swinging social and political pressures away from price boosting measures and in educating the community in the social and economic advantages of lower costs and hence lower prices. In these days when government spending and labor union and farm politics are so generally in the direction of inflation, there would be some substantial gain from any method of accounting which throws more light upon the road along which we are being pushed.

COMING ARTICLES

In the *N. A. C. A. Bulletin*, February 15, 1948

Duties and Responsibilities of the Accounting Executive
by Irving D. Dawes

Market Research and Testing
by George M. Arisman

Control of State-wide Liquor Inventories
by C. Robert Angell

POINTS OF VIEW

TO SUBMIT to management only the usual statements dealing in dollars and units is to assume that management not only will comprehend and recognize all of the factors known to the accountant but will take the time to study and interpret the statements. (*Bartlett F. Crawford, Tulsa*)

* * *

I believe that as a training program the cost accountant should spend at least six months to a year in the plant studying all the operations and personnel. (Peter C. Jung, Northern Wisconsin)

* * *

THE MEN who keep the machinery running . . . should not be expected to digest the usual reports. They can, however, understand simple charts comparing their daily output in units of production with logical, predetermined goals. (*N. E. Dodd, Dallas*)

* * *

Personnel in charge of supplies should constantly be on the alert for changes in product, customers' specifications, or nature and specification of supply items . . . thereby holding to a minimum inventory of articles which may suddenly become obsolete. (O. J. Swartz, Lancaster)

* * *

THE accountant can preach reduction of company overhead as a whole but if real progress is to be made he must single out certain expense classifications and devise a way toward their reduction. (*A. L. Lafave, Detroit*)

* * *

We give lip service to the idea that accounting is not an end in itself but our actions so often belie the facts. (H. M. Daniels, Houston)

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WITHOUT a heavy grounding in the art of both written and oral self-expression and a sound understanding of the psychology of human relations, the finest technical education is either diluted or altogether wasted. We must strive for better balance in our research and educational programs. (*Verne Breitenbucher, Los Angeles*)

COST LINES

IT IS up to the accountants to take the initiative in selling their sales and marketing executives on the importance of distribution costs. These men will not be impressed (merely) by *methods* and theories of cost determination or by the average ratio of distribution costs to the consumers sales dollar. (*Paul G. Brown, New Haven*)

* * *

I think that too often our cost standards or budgets are set up with too much emphasis on an elaborate control and too little on the matter of flexibility and cost of operation. (David E. Lutz, Harrisburg)

* * *

STANDARD cost . . . recognizes that some of the expenditures in a factory are costs of idleness, wasted time, wasted material, poor planning, and general inefficiency. (*Michael J. Grisak, Calumet*)

* * *

Many budgetary accountants and controllers . . . are prone to skip over the subject of indirect labor in their anxiety to weigh and evaluate direct labor and direct materials in their budget considerations. (Frank J. Frech, Rockford)

* * *

I CANNOT urge too strongly the necessity for a positive and permanent continuance of a unit set up (to exercise control) over printed matter. If proper controls are not exercised, it is reasonable to believe that the former problem (of a multitude of forms and letterheads) will recur and the benefits of the program will be lost. (*H. J. Fitzgerald, Pittsburgh*)

* * *

Each department, theoretically, is a unit in itself . . . but what good is a wheel without the whole car? (A. R. Boge, Dayton)

* * *

IN OUR operation we have one cost man devoting his full time to material utilization and scrap control . . . He has been able to develop a keen interest in this work throughout the production departments and this is one of the strongest factors in scrap control. (*A. A. Rudkin, Youngstown*)

GOOD INVENTORY MANAGEMENT

by THOMAS B. NOBLE,

Assistant Treasurer, Stockham Pipe Fittings Co.,
Birmingham, Ala.

CURRENT conditions have emphasized the magnitude of the financial problem related to inventories. To illustrate this, permit me to cite a few figures taken at random from published financial statements. (The term "working capital" used in the following examples refers to net current assets shown by the published balance sheets, i.e., total current assets, less total current liabilities.)

A Manufacturer

A large manufacturing company during the year ended September 30, 1947, increased its inventory amount 53 per cent. On September 30, 1947, 77 per cent of its working capital was tied up in inventories, compared with 53 per cent a year prior to that date.

During the year 1946, another large manufacturing company increased its inventory 133 per cent. At the end of the year its inventory was equal to 128 per cent of its working capital. The inventory was more than doubled during 1946, in spite of the fact that a condition of serious unbalance in relation to working capital existed at the first of the year, when the inventory amounted to 117 per cent of working capital. The increase was made possible only by some very heavy long-term financing. Apparently this manufacturer continued high production schedules too long after demand for its products began to shrink. Obviously it has been making more goods than it has been selling. Possibly stockholders drew some comfort from the fact that the president of the company, in his annual report for 1946, admitted he was aware that inventories had accumulated to a disturbing degree.

Here are some more figures that may help us to bring the size of this company's inventory problem into better focus: at the 1946 rate of net profits and dividends, it would require about ten years for the company to retain enough money in the business to replace the December 31, 1946 inventory. During 1946 the inventory increase was over eleven times the earnings for the previous year.

A Chain Store

A chain store business had this experience with its inventories for the fiscal year ended January 31, 1947:

Inventory increase for the year	108%
Working capital invested in inventories:	
January 31, 1946	43%
January 31, 1947	69%

Reserve for inventory losses:

January 31, 1946—Approximately $750,000 representing 3 per cent of the inventory value.

January 31, 1947—Approximately $6,600,000 representing 14 per cent of the inventory value.

A Jobber

A jobbing company with retail outlets had this experience:

During 1946 its inventories increased	56%
Working capital invested in inventory:	
December 31, 1945	64%
December 31, 1946	95%

At the 1946 rate of profits and dividends it would take 12½ years for the company to retain enough earnings to cover the 1946 inventory increase. If the company paid nothing at all to its stockholders for the use of their money, five years as good as 1946 would be required for it to pay for the 1946 inventory increase.

These are just a few examples. It is not suggested that they represent a conclusive statistical sample. A study of recent published balance sheets of a more comprehensive group of corporations doing business of a nature that requires substantial inventories of raw materials, supplies, and merchandise for sale will reveal, however, that these examples are in line with the general pattern. Perhaps some of us, during this long sellers' market with all the shortages, forced hand-to-mouth buying, allocation of material, and general dislocation of normal sources of supply, have forgotten that conditions such as I have just outlined could ever come about. Most of us, I believe, do not realize how much money we will need to replace normal prewar inventory quantities at current cost prices.

The Problem

Many of you have read the book, "The Control and Valuation of Inventories," published by N. A. C. A. a few years ago, and will recall the following remarks in the first paragraph of the introduction:

> "It hardly seems necessary to defend the importance of inventories and inventory problems in modern business. Inventories have been called the graveyard of American business because they have so frequently been the prime cause of business failures."

From the foregoing, it might appear that only overstocked conditions and the necessity for increasing turnover are serious. This is not true, as understocked conditions can be just as serious. There is also such a thing as too high a rate of turnover. The important point, however, is that the time is here for us to do some careful work on our inventories.

Let us now state our problem. What is good inventory management? What do we strive to accomplish? Someone has said that it is having material on hand, of the right quality in the right quantities at the right times and at the right prices. Now that sentence sounds fairly simple, and to anyone not trained in business, may suggest a simple set of problems. We know, however, that the attainment of even a moderately successful achievement in relation to the goal set up in that sentence is a major administrative problem.

What is Material "Control"?

If we are going to have good inventory management we must have some tools with which to do the job—and right here is where all too many businesses get off the track. It would often seem that we accountants are to blame for the trouble. We have gotten into the habit of calling our bookkeeping records and reports "control systems." We set up a stock ledger or some form of continuous inventory record and tie into it the necessary paper work, operations, and procedures to provide an accurate record of material movement and inventory balances. Then we call it a "Material Control System." Look in the dictionary some time and you will find that the word "control" means "restraint, superintendence, authority, to restrain, govern, regulate." Those things cannot be

done by an inventory ledger or any other inanimate object. It takes a person or people to exercise control. What we call a "material control system" should be called a "material record system," then management would not have an excuse to sit back and expect the job to be done automatically. Good inventory, management, or control, is a matter of intelligence and not a matter of system or routine. But intelligence alone is not enough. It must be aided by the proper tools, and our well-planned and well-operated record system can be made an invaluable tool of good inventory management. I do not mean to minimize the importance of a good material record system. I simply want to emphasize the fact that a system is not control.

Functions

We will now outline what we should do to have material of the right quality on hand in the right quantities at the right times and at the right prices. I believe that we must prepare for the following functions:

1. Buying or procurement.
2. Receiving, inspecting, storing, and distributing or issuing.
3. In the case of manufacturing, scheduling or production control.
4. Determination of quantities to buy and keep on hand, timing (time to buy, time to receive, points at which peak quantities should be on hand and points at which quantities should drop to a minimum), specifications, clearance of obsolete and damaged material, and physical inventory taking and pricing.

Volumes have been written about each of these points or functions, and obviously we can do no more in this limited space than touch on the high spots.

Buying or Purchasing

Let us pass over the specialized problems of retailers, wholesalers, and large processors of agricultural products and talk a little bit about buying problems of manufacturers. In my opinion, one of the largest problems we have right now is what might be termed a psychological one. For a good many years now the emphasis has been on procurement without regard to price. Purchasing agents

have been under great pressure to get supplies and materials to keep plants running. Much of the time *first* consideration has been to set the material, regardless of cost. When the alternative was a plant shut-down, particularly during war time, we could understand the overlooking of cost considerations. There are still shortages in many lines and there may continue to be enough of this sort of thing to carry the wartime buying psychology for several months yet. But we owe it to our customers to shop more carefully for materials entering into the costs of the products we sell. It may be hard to get back to prewar practices of shopping around and obtaining competitive bids, but I do not think anyone will argue against the necessity for it.

Our material record systems and buying procedures must furnish purchasing agents with information they need as to quantities, delivery required, and specifications of material needed. There must be close cooperation between buyers and the control authority on these matters. Buyers can be of assistance in establishing ordering units, giving information as to delivery time, and in passing on to the control authority information from vendors or the sources of supply concerning market conditions, new products, etc.

Receiving, Inspecting, Storing, and Distributing or Issuing

It is essential that accountability for materials be established as early as possible in the procurement procedure. Facilities should be provided for centralized receiving, checking, inspecting, and reporting of receipts. Proper control of inventories is impossible unless the physical facilities for handling and storing material are available. Poor arrangement of stock rooms will inevitably result in delays in production schedules or in filling orders, accumulation of materials beyond those needed, excess handling cost, and obsolescence. Proper paper work and procedures must be provided to clearly show when those accountable for the storing of materials have fully discharged their responsibilities. In a manufacturing concern this is usually accomplished with a requisition system of some kind.

Scheduling and Production Control

Manufacturers inventory problems are different from those of trading or merchandise concerns in that the manufacturer must carry inventories of raw materials, purchased parts, and supplies received from outside sources, as well as inventories of products

of their own manufacture. This is particularly true of any manufacturer making a standard item which is normally manufactured and stocked in anticipation of future orders. The production scheduling or production control function then ties into two aspects of the inventory management problem. The quantities of items to be manufactured must be determined in relationship to customers orders and amounts to be carried in inventory. Then, the materials and parts necessary for the manufacture of these items must be bought in relation to the manufacturing schedule. All large manufacturers buy and stock many items. The operating supplies cannot be directly related to the manufacturing or scheduling activities. The needs for such items as cutting tools, lubricants, electrical supplies, janitors' supplies, maintenance parts, etc., are related to total operating time more directly than to the products to be manufactured—and require planning accordingly.

Quantities

As is generally known, one of the most difficult inventory management jobs is that of determining quantities to buy or manufacture and keep on hand. Many of our so-called material control and production control systems attempt to set up automatic devices for doing the job. Thus, we find in our systems provision on inventory record cards for showing minimum and maximum quantities and ordering point. When carefully worked out by people of mature judgment with a knowledge of the business, inventory minimums and maximums and ordering points are extremely helpful and are quite essential to economical control where the number of different items involved is large. However, everyone using these devices should understand their limitations and take steps to minimize the losses which are bound to occur if the system is permitted to operate on a purely automatic basis.

If demand is fluctuating it is quite obvious that any system which produces a level or constant inventory turnover will result in loss. This is because inventories will always be at their peak at the top of the demand and price cycle, or soon after such cycle reaches its peak. Recent past experience alone is not a reliable basis for establishing requirements for any major item of material. Past experience is always helpful, but the determination of quantities of all items of relative importance, the time at which the quantity should be at the highest permissible level and the time at which it should be permitted to drop to its lowest point, should al-

ways be in the hands of a person of mature judgment having a knowledge of the company's plans, its backlog of orders, and the general trend of business.

Obsolescence

In every inventory of any size and diversification there will accumulate some items which are obsolete in relation to the needs of the business, slow selling, or damaged and shop worn. Well-managed retail outlets are in the habit of giving attention to such items, keeping them at a minimum, and clearing them from their stocks by one device or another. Manufacturers are not always so careful about such matters. All too often storekeepers in manufacturing organizations have no means of knowing when a machine using a certain part or supply item is retired or taken out of production. Thus some items in the stock room have no future use in the business. Operating men and engineering departments sometimes change their ideas as to what materials or tools are best suited for a job. They issue specifications calling for something new, while substantial stocks of the old articles are still on hand.

It is quite common for all businesses that sell on credit to have a responsible person constantly reviewing the accounts receivable to see that all accounts are kept in a current condition and that no charges are permitted to become past due without attention. It is not so common, however, to find a person of equal ability constantly reviewing the material record system and giving attention to items which are slow moving or not turning as they should. This is true, notwithstanding the fact that frequently more working capital is tied up in inventories than in accounts receivable, and in spite of the fact that working capital in inventories is subject to the hazards of price fluctuations.

Clearance Sales

It is not unusual for retailers to conduct clearance sales for the purpose of relieving their inventory of slow-moving or obsolete merchandise. I know of only one instance of a manufacturing company doing a similar thing to relieve its operating supply inventory of slow-moving and obsolete items. A short time after the war the materials control manager of one company conducted a "clearance sale." He had a very successful sale. You may be interested in the way it was done. Slow-moving items and items expected to become obsolete were taken from their regular places in

stock and put out for display. Operating superintendents were told of the "sale" and were invited to come and look at the items available. Some of the items were available for issue without charge, since it was known that they could be utilized in some department in place of other materials which were preferred and that superintendents were unlikely to want to permit their expense accounts to carry charges for nonpreferred material. The prices of other items were marked down to a point that made them attractive expense-wise. In this way the company was able to obtain utility much greater than market value from a part of the inventory investment while at the same time relieving the inventory of these items.

Physical inventories, whether taken to cover all items in stock as of the same date or on some sort of continuous basis, are extremely important to good inventory management. A good physical inventory requires careful advance planning to insure that the count and description of materials on hand are accurate. Pricing of the inventory is very important as it has a direct relationship to the profit or loss showing. Pricing policies should be covered by written instructions which should be carefully followed from year to year to insure consistency.

Turnover

Probably the most common statistical figure or ratio used to judge inventory performance is the rate of turnover. Turnover of goods for sale is computed, as you know, by dividing the sales by the average inventory at selling price (if such an average inventory figure is available), or by dividing the cost of sales for a period by the average inventory at cost during the period. Turnover for supplies and raw materials is computed by dividing the value of material issued or used for a period by the average inventory for the period.

An Example

Turnover statistics are valuable and should be used—but used with discretion. Let me give you an example of how turnover figures related to total inventory figures can be misleading.

Recently in reviewing the inventory situation of a manufacturing company, I found that its average inventory of purchased parts, raw materials, and manufacturing supplies was turning at the rate of nine times per annum. On the face of things that was not bad.

Perhaps they should have had a higher turnover, but on the other hand it did not appear much too low. However, there was one thing that troubled me as I looked at that figure based on total inventory. I knew that some raw materials representing a substantial portion of the movement in and out of the inventory accounts were probably turning at the rate of from ten to 20 times per month. Therefore, I looked a little deeper. The demand for one of the product lines of that manufacturer had fallen off considerably, so I computed the rate of turnover of the principal raw materials and purchased parts for that line of products. I discovered that—

1. These items, representing 38 per cent of the average total material and supply inventory, were turning only 1.13 times per year.
2. The remaining part of this inventory was turning 14 times per year.
3. The slow-moving part on hand November 1 represented 78 weeks requirements on an over-all dollar basis, judging by consumption of the previous three months.

I then looked at the turnover performance for finished goods and found the finished goods inventory total to be turning about ten times a year. But the class of material in greatest demand was turning more than fifty times a year. Finished products related to the slow-moving materials previously mentioned represented 78 per cent of the average inventory and were turning less than one and one-half times a year.

What Turnover?

Department store controllers and merchandise managers spend a substantial part of their time trying to increase inventory turnover. The emphasis is such that some people get the opinion that the higher the turnover, the better the job they are doing. Nothing could be farther from the truth. If a turnover of six times per annum is good for a department, it does not follow that ten turns is excellent. At ten turns a year the stock condition may be such as to cause serious loss of sales volume and profits. The sales lost may have a far greater adverse affect on the profit of the department than the good which might result from a saving in mark-downs made possible by carrying less stock so as to get ten turns.

Well-managed department stores have good tools for studying merchandise movements. In addition to departmental breakdowns

which divide the merchandise into generally related groups, every piece of merchandise in the store, with the possible exception of a few specialized departments in some stores, is marked to indicate the selling season in which it is received. It is therefore possible to look at any piece of merchandise and tell how long it has been on hand. The controller can tell from physical inventories aging whether slow-moving items are getting to be a problem. If a department is showing a good rate of turnover with considerable old merchandise on hand, the high turnover rate indicates to the controller that the department is losing sales because of lack of current merchandise. Steps to provide "open to buy" for the department are indicated—the slow-moving items must be forced out of stock by mark-downs and other merchandising methods.

Many manufacturing concerns too have good tools for studying material movements. The detailed records of inventory transactions and continuous balances provide information which can, when related to requirements, provide the means of keeping inventory quantities within desired limits under most conditions. The trouble is, I expect, that too often we do not make full use of the information.

Efforts to obtain reasonable turnover without adequate experience and information as to quantities required and desirable inventory limits is likely to lead to hand-to-mouth buying.

Hand-to-mouth buying is bad and should be avoided. There was too much of a trend in the direction of hand-to-mouth buying prior to the war. It is a drag on the economy, increasing cost all along the line, because

1. It causes the expenditure of nonproductive effort by making it necessary to manufacture in smaller lots, thereby increasing clerical work, job change and setup time, and handling.
2. It frequently leads to the use of more costly mediums of transportation than would otherwise be required.
3. It results in production delays and the loss of sales on the receiving end.
4. It sometimes requires seasonal operations by manufacturers when more stable operations would produce products of better quality at lower cost.

It is the function of some businesses to carry reasonable inventories and their existence is justified only if they do. Part of the

difference in cost and selling price we pay to wholesalers and retailers is supposed to be for their services in carrying stocks of goods for us. So it behooves us all to devise ways and means of handling our inventories so that we can reasonably anticipate quantities needed and buy in economical lots, while at the same time avoiding all possible losses that stem from excess quantities, such as losses in value due to price declines and obsolescence, storage and handling cost, insurance, etc.

Summary

In summing up, let us mention briefly a few thoughts we should all store in our minds as being worthy of further study and reflection:

1. The fact that inventories account for a large portion of the working capital requirements of most businesses makes the inventory management or control problem one of major importance. The problem requires constant attention by top administrative people.
2. At present the problem is made acute by market conditions and high cost.
3. To do a proper job of inventory control there must be someone in the organization with responsibility for, and authority over, the various details of procuring, maintaining, and disposal of inventory. This person must have the ability to obtain, coordinate, and evaluate the necessary facts and to take and get action when action is needed.

N.A.C.A. BULLETIN

Section Three

RESEARCH SERIES NO. 11

A REEXAMINATION OF STANDARD COSTS

VOL. XXIX, NO. 11 FEBRUARY 1, 1948

FOREWORD

The present report is the first of a series dealing with the subject of standard costs. In this first report the entire field of standard costs is surveyed with emphasis on their uses, the ways in which the various uses are coordinated, and the principal problems which arise in developing and applying standard costs for each purpose. Other studies to follow will present in more specific terms current practice in the use of standard costs.

I. Wayne Keller, *Chairman,*
Committee on Research.

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A REEXAMINATION OF STANDARD COSTS

COSTS may be determined before the fact and after the fact. Both predetermined costs and actual[1] or historical costs have their place in modern industrial management. To take action or make an important decision without an estimate or predetermination of the costs involved is to gamble or to speculate rather than to manage. Equally evident of lack of management is failure to determine the costs after the fact and to compare them with the advance estimates or standards.

Perhaps too much attention to cost "systems" and too little attention to cost uses has led to a lack of appreciation of the complementary roles which predetermined or standard costs on the one hand and actual or historical costs on the other hand can and should play in the management of industrial companies. As stated in an earlier paper, "Costs are used for a variety of purposes, and the same cost cannot serve all purposes equally well."[2] For some purposes historical costs are most useful, for others predetermined costs are needed, and for still others a comparison of the two serves management best.

The purpose of this study is to inquire into the various uses of standard costs, to question how well standard costs can serve these purposes, and to point out the areas of conflict and compromise which arise. This study will be followed by others dealing more specifically with present-day practice in the use of standard costs for various purposes.

Both Standard and Historical Costs Needed

While this study deals with standard costs, it is based upon the premise that such standards complement rather than replace actual costs. Actual or historical costs are an essential part of any accounting system. Financial accounting, representing as it does a reporting of current financial conditions and results of over-all operations, must have as its base as accurate as possible a reporting of the actual or historical costs. The use of standards does not in-

[1] Actual cost is used here to mean the cost which is accumulated during the process of production by the usual historical costing methods as opposed to the cost which has been determined in advance of the production process. The term "actual" is not intened to convey any implications as to the accuracy with which costs are measured.

[2] "The Uses and Classifications of Costs," *N. A. C. A. Bulletin*, Sec. III, May 15, 1946, p. 939.

volve the elimination of actual or historical costs; rather in its most complete application it involves the presentation of historical costs in two parts, separating from the part which is standard the part which represents a variation from standard. Thus, the recording of actual historical costs in the form of totals is not abandoned for they are still essential in determining the financial results of operations and as a check upon the standard costs.

By the same token historical costs alone are not enough. If a business is to be managed and controlled some advance indication of costs is essential. For cost control, planning, and pricing, management needs predetermined costs. Whether these predetermined costs are merely mental guesses made by the persons involved, formal estimates which can be used later for comparison with actual costs, or complete standards which are incorporated into the books of account, there is general agreement with the idea that some predetermination is desirable if not essential to successful business management. Any disagreement is likely to relate to the degree of coordination of predetermined costs with actual costs, rather than to the need for them. This can readily be seen in an examination of the historical development of the application of standard cost accounting.

Historical Development of Standard Costs

Estimates of cost were employed for pricing and for costing inventories before there was any formal cost accounting. However, early cost accounting was almost entirely historical in nature. Process or job-order methods were used to compile actual costs. The men who designed these cost systems had often been trained in the financial accounting field and they developed their cost accounting plans primarily to supply the inventory and cost of sales figures which were needed for the preparation of financial statements and product costs for use in pricing. At this time the most usual approach to improvement in cost accounting was thought to be through provision of costs in greater detail by the wider application and betterment of job-order cost recording.

Influence of the Scientific Management Movement

With the scientific management movement came the development of industrial standards for use both in planning manufacturing operations and in evaluating the effectiveness with which work was being done. Perhaps the best definition of such an industrial standard is the following:

> "A standard under modern scientific management is simply a careful thought out method of performing a function, or carefully drawn specification covering an implement or some article of stores or of product. . . . The standard method of doing anything is simply the best method that can be devised at the time the standard is drawn."[3]

Such standards were a great improvement in the basic data used by management for two reasons, viz.:

1. They were based upon systematic observation, measurement, and controlled experiment—all factors which meant a marked increase in reliability.
2. They were recorded and made generally available within the company.

These early standards were, of course, engineering or physical standards expressed in methods of operation, units of material, and hours of labor. The fundamental standards used to plan and control production in the factory are still of the same type. However, it was soon discovered that the same approach could be used in the control of manufacturing costs. This process developed in two directions:

1. Translation of physical standards into unit cost standards to be used in accounting for direct material and direct labor costs.
2. Development of budgets as a basis for controlling indirect costs which were not controllable by unit cost standards.

Historically, standard costs as we now know them and business budgeting developed at about the same time but in the earlier years their development was largely separate. Standard costs developed in the factory while budgeting was applied first to the financial aspect of business. Later on it was realized that both were merely applications of the same management philosophy and that they were complementary parts of a complete program of cost control.

Standard Costs vs. Estimated Costs

It seems that the direct antecedents of modern standard cost accounting methods were estimating costing methods. Examples of

[3] Morris L. Cooke, quoted in the *Cost and Production Handbook*, p. 304. This definition has been adopted by Webster's Unabridged Dictionary.

the early use of such costing plans are common in the manufacturing of textiles, shoes, and fabricated brass products. Cost accounting methods used by these businesses commonly relied upon estimates prepared in advance for detailed product unit costs. The estimated unit costs were sometimes incorporated into the books and used to cost factory production. Estimated costs were then compared in total with actual costs and, if the differences were materially significant, inventory and cost-of-sales figures were corrected to reflect approximate actual costs.

However, these estimated costs were not standard costs. The distinction between them has been brought out by one writer as follows:[4]

> "A great difference exists between modern standard costs and the cost estimates maintained by some mills, which they sometimes confuse with standard cost methods. Approved predetermined costs reflect what the cost of each style should be and represent the results expected from the mill. Actual results are carefully controlled and kept within the standards in all possible cases. . . . Thus while standard costs are considered as representing the real cost with the actual results accordingly gauged, estimated costs are merely guesses with periodic attempts to reconcile them with actual operating results. Older cost methods . . . merely look to the operating results. Modern standard cost accounting methods decide what the costs should be and then take steps to realize these standards through actual operating."

With the development of standard costs, the technique of incorporating predetermined costs into the accounts was utilized for costing production, with the standard costs replacing estimated cost. Some accountants then began to use standard costs rather than actual costs for inventory costing on the theory that the planned costs provided a better basis for stating the cost of products remaining in the closing inventory than did the actual costs. However, this point of view was not accepted by all who used standard costs.

One writer has summarized this difference of opinion as follows:

> "Accountants, generally, appear to be divided into two groups over the question and their views are almost diamet-

[4] Clinton W. Bennett, "Some Phases of Woolen Mill Cost Accounting," *N. A. C. A. Year Book*, 1922, pp. 341-342.

rically opposed. One group holds that costs can only be "actual" costs, and that, therefore, standards, no matter how useful from a statistical standpoint, should not be reflected in the general records. This group, however, will modify their beliefs to the extent of permitting the elimination from costs of variances due to idle plant capacity, but they feel that all other forms of variances are merely fictitious debits and credits which should be ignored in the general records. Another major group of accountants holds that standard costs are "true costs" and that any excess over standard costs is a waste, and, therefore, a proper profit and loss charge. Their contention is not so much that this excess over standard is not a *cost*, but that it is a *cost of waste or inefficiency* and should not be confused with *cost of goods or product*."[8]

In the course of this development operating executives found that it was more profitable to concentrate attention upon the deviations of actual from standard, rather than upon the actual costs. Hence, instead of merely using the variances to convert predetermined costs to an actual basis, the variances are now reported in terms of personal responsibility for cost incurrence and used by management in its efforts to control costs.

Development of Standard Overhead Rates

The development of predetermined overhead rates which took place in the early years of the present century also contributed heavily to the line of thinking which has crystallized in the present-day concept of standard costs. It was realized that actual unit costs which could not be determined until the end of the period, and which fluctuated with the volume of work done in the factory because of the fixed cost component were not satisfactory costs either for inventory costing or for pricing purposes. Accordingly accountants began to use predetermined rates for applying or absorbing indirect costs. These rates were designed to obtain full absorption of fixed costs at a normal rate of activity and to exclude the costs of maintaining idle facilities from the costs of producing goods. When predetermined overhead rates were adopted, reported unit costs no longer increased when volume declined and decreased when volume increased. As a result account-

[8] Clifford G. Wood, "Disposition of Variances from Standard," *N. A. C. A. Bulletin*, Jan. 1, 1939, p. 548.

ing costs were made more useful. With the refinement of methods for setting overhead rates, these early predetermined rates became the standard overhead rates of present-day cost systems.

While standard overhead rates successfully met objections to actual overhead rates for the purposes of costing production and for pricing, they had comparatively little value in the control of costs. The principal reason for this is that indirect costs are made up of expenses which differ widely in their controllability. The over- or underabsorbed overhead as determined by the earlier cost systems reflected the combined effects of variations from standard volume and variations in the amount spent. The next step was to devise ways for measuring performance in spending apart from the variations in cost due to fluctuations in activity. This required that standards be set to show how much indirect costs should be for any given rate of activity in the plant. Until this was accomplished, control of indirect costs was much less effective than the control exercised over direct costs.

Development of indirect cost standards which management could use to obtain better control of this element of cost required, first, that cost standards be set in terms of the expense allowable for the actual volume of production rather than for the normal volume used for cost absorption, and second, that the classification of costs used for cost control purposes be developed in such a manner that costs, both actual and standard, would be listed according to persons in the organization who possessed authority to incur each specific item of cost. This offered little difficulty with direct costs, but with indirect costs the problem was considerably more complicated.

The first indirect cost budgets were of the fixed type based upon the production forecast for the period ahead. Thus the expense allowance provided for the period was that considered proper for the volume of activity which was anticipated in the forecast for the period. However, these budgeted amounts of expense were suitable control standards only when the actual level of activity happened to be the same as that forecast when the budget was prepared. While this difficulty could be overcome to some extent by shortening the budget period and by revising the factory budget when the actual volume of activity differed from that forecast, these methods seldom achieved satisfactory results.

This shortcoming of the fixed budget was overcome by the development of the textile or variable budget which provided oper-

ating management with an indirect cost standard for any level of activity which was likely to be met. Flexible budget standards accomplished this aim by being designed in the form of a schedule from which could be read the amount of expense which should be incurred at any given level of activity within the range of the budget. Variances from the budget standard could then be interpreted as the result of spending more or less than the standard figure for the actual volume of work done during the period.

Thus it is seen that the trend of cost accounting over the years has been toward broadening its usefulness. It began as a bookkeeping technique used principally for building up the inventory and cost of sales figures needed for the financial statements. As such it was almost entirely historical in character. While management has always needed to know what future costs are likely to be for the purposes of planning production and setting prices, it formerly could obtain this data only from estimates which were often not related to the costs recorded on the books.

With the development of standard costs, cost accounting became a valuable tool which management could use to control direct costs. This control was later extended to indirect costs through the development of flexible budgets. The improved reliability of costs based upon a set of good physical standards together with the forward-looking character of standard costs has also greatly extended the usefulness of cost accounting as a source of data that management can use to advantage for planning and pricing. In this process, the standard costs have merely replaced the estimates and unscientific opinions which were formerly used for purposes where predetermined costs were needed. Whereas these predetermined costs were formerly kept apart from the books, it is now common to incorporate the standard costs into the accounting records. In doing so, the cost accountant has usually simplified his work and has broadened its usefulness to management.

Differences of Opinion Regarding Uses of Standard Costs

At the first Annual Conference of the National Association of Cost Accountants held in 1920, there was a session entitled "The Relation of Cost Accounting to Business Management." While the papers which were read at this session and the discussion which followed showed that there was a lively interest in standard costs at that time, they also disclosed the existence of wide differences of opinion with regard to the uses and applications of standard costs.

Many of these same questions have been raised at practically every discussion of the subject in the years which have followed. Some of these differences are largely differences of terminology. Thus standard costs have also been called scheduled costs, specification costs, predicted costs, planned costs, predetermined costs, and budgeted costs. While the terms employed have been the basis for many debates, they are not matters of great importance today. Other differences represent genuine divisions of opinion with respect to the nature and purposes of standard costs. It is these differences which will be the subject of this inquiry.

It appears that many of the controversies over standard costs have their root in the different uses which are made of cost figures. In "The Uses and Classifications of Costs" it was stated that "Many of the apparent differences of opinion among cost accountants are not fundamental but arise from failure to recognize that cost data prepared for one purpose may not be appropriate for other purposes."[6] This statement applies to standard costs as well as to actual costs. In the preceding pages it has been shown that standard costs are not an alternative to actual costs but that rather the choice lies between standard costs and the less scientific cost estimates. The remainder of the study will be devoted to a consideration of the applications of standard costs to meet the needs of management for costs to be used for the purposes of cost control, inventory costing, budgetary planning, and pricing.

Standard Costs for Cost Control

How Costs Are Controlled

Cost control has as its objective production of the required quality at the lowest cost attainable under existing conditions. It presupposes a plan or program which is embodied in a set of standards specifying how each job is to be done and what it ought to cost to do it. Operation under the standards then proceeds by comparing actual costs with the standard costs as the work is being done and by taking appropriate action to correct unfavorable deviations from the standard costs as such deviations occur.

However, cost control is not exclusively or even primarily an accounting process, although accounting methods do have an important part in cost control. In general, operation control must precede cost control. The problems of developing product speci-

[6] *N. A. C. A. Bulletin*, Sec. III, May 15, 1946, p. 939.

fications, operation methods, and operation times are a responsibility of the engineering or operating division of the business; hence, the control standards which are based upon production methods are established by the production division. On the other hand, it is the duty of the accounting department to measure performance relative to these standards and to keep management informed as to the effectiveness of its efforts in cost control. The matter of how best to bring the costs under control is then again an operating rather than an accounting function.

Type of Standards Most Useful for Cost Control

Standards which are to be applied for cost control must provide answers to the following three questions:

1. For what should costs be incurred?
2. How much should the cost be?
3. Who is responsible for control of the costs?

These topics will be discussed in the order listed above.

For What Should Costs Be Incurred?

Standards should be set for each cost item of consequence. Product unit costs are built up from their components since the cost of a finished product unit is made up of materials, labor, and overhead. Each of these cost elements ordinarily represents various quantities of different materials, a number of separate labor operations, and a more or less extensive variety of manufacturing facilities and services. Effective control requires detailed standards to show how much of each material should be used, how much labor should be required for each operation, and what facilities and services will be needed. The actual number of separate standards required to give this detail will be governed by the complexity of the manufacturing process, but in all cases the standards should tell exactly what should be used to accomplish the task.

Such control at the factory operation level is primarily a matter of controlling quantities and usage of material, labor, and services. Hence for the foremen and other employees who are directly in contact with the work it may be preferable to state both standards and variances in terms of physical units—i.e., in pounds of material, hours of labor, etc. However, when details are combined in summary form for the use of supervisory employees, it then be-

comes necessary to state standards as dollar costs. The actual quantities consumed are likewise priced at standard rates in order to permit measurement of cost performance under quantity standards free from the influence of price changes.

How Much Should the Cost Be?

In order that a standard may specify how much should be spent to accomplish a given task, it is necessary to determine, first, the "tightness" with which the standard is to be set, and second, how the total amount spent will change with the level of activity in the cost center.

The tightness with which standards are set differs widely among users of standard costs. In this respect, standards vary from those which are well above possible attainment down to those which are merely averages of uncontrolled past performance. While these standards merge into one another and cannot always be clearly separated in practice, the following standards may be distinguished here for purposes of discussion.

1. The theoretical, ideal, or maximum efficiency standard. Such costs represent the best performance possible with the equipment in the plant. Some allowances for rest periods and personal needs of operators will probably be included in the standard, but no allowances for waste, spoilage, or lost time are made when setting the standards. It is not expected that such standards will be attained in actual operations, but the standards are set up as goals toward which to work in the attempt to improve efficiency.
2. The attainable good performance standard. This standard does not eliminate all waste, spoilage, lost time, etc., but includes these elements to the extent that management considers them impractical of elimination during the time the standard is to be in effect. A standard of this type can be met or even bettered, but only by what is regarded as efficient performance.
3. Average past performance standard. Standards are sometimes based upon what has been done in the past without adjustment to reflect methods which may be subject to improvement and without elimination of past wastes and inefficiencies. Since jobs on which performance is poor

> are likely to be more numerous and more extreme than are jobs on which performance is exceptionally good, such a standard is usually considerably looser than are standards of the preceding types.

Where the standards are too tight, there is no definite and known objective which employees can reasonably be expected to meet. They soon realize that the goals set for them are unattainable and cease to pay serious attention to the standards. Management finds it difficult to hold employees responsible for variances when it is not known what portion of the variance represents avoidable inefficiency and what portion represents cost reduction which could be obtained by perfection. Concerning a standard of this type William M. Lybrand has remarked that ". . . there will always be opportunity to explain away or excuse the failure to reach it."[7]

While it is sometimes said that an unattainably tight standard provides an incentive to reduce costs, it seems that this use of the standard confuses the objectives of cost reduction and cost control. Cost reduction proceeds by finding ways to achieve a given result through improved design, better methods, new layouts, incentive plans, etc. Hence cost reduction results in the establishment of new standards. On the other hand, cost control is a process of maintaining performance at as near existing standards as is possible. If standards are tighter than performance currently attainable, the lower cost will not necessarily follow unless the cost reduction program has first shown a practical method whereby the tighter standard can be attained. On the other hand, a standard which is set so loose that it can be met by poor performance buries the very inefficiencies that standard costs are intended to disclose.

Thus it would seem that the type of standard most effective in the control of costs is one which represents an attainable level of good performance. Such standards provide definite goals which employees can usually be expected to reach and they also appear to be fair bases from which to measure deviations for which employees are held responsible. A standard set at a level which is high yet still attainable with reasonably diligent effort and attention to the correct methods of doing the job may also be effective for stimulating efficiency.

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[7] "Relation of Cost Accounting to Business Management—From the Viewpoint of the Professional Accountant." *N. A. C. A. Year Book*, 1920, p. 66.

It is not possible to define more precisely the exact level at which to set a control standard, for it is a question of judgment applied to the specific circumstances. It is also a matter which will change from time to time, for standards which were difficult to meet in the beginning may be too low at a later date when the methods underlying them have become familiar to the employees.

In determining how much should be spent, consideration must also be given to variations in cost which accompany fluctuations in the level of activity. The effect which volume fluctuations have on cost is easily handled when the costs are direct costs, since here the total amount which should be spent varies proportionately with the number of units produced. Direct costs can be satisfactorily controlled by unit cost standards. On the other hand, indirect costs cannot be controlled with standards in unit form because the average overhead per unit tends to vary as the volume of production increases or decreases. This, of course, results from the presence of costs which do not vary with production volume.

To meet this difficulty the cost standards used to control variable indirect cost are set in the form of a flexible budget which gives the total amount of each cost which should be incurred at each level of activity within a specified range. By comparing the actual expense with the standard amount shown by the flexible budget for the actual rate of activity it is then possible to obtain a variance which reflects the effectiveness of operating performance.

Material and Labor Price Standards

Ordinarily material and labor price standards have a comparatively limited value in exercising control over costs. However, material price standards make it possible to measure certain aspects of purchasing performance. Thus increases in material costs which result from purchase in uneconomical lots or from failure to take advantage of lowest cost transportation can be brought out as material price variances. Controllable labor price variances may also arise from the use of men with the wrong rate for the job. Even though operating management cannot control prices, the development of price variances may be useful in keeping top executives informed regarding the effect which changes in these cost influences will have on profits. Price standards are also necessary in order to permit measurement of cost performances under quantity standards, for otherwise it is not possible to say what

portion of a variance is due to a deviation from the quantity standard and what portion has resulted from a change in price.

To the extent that price standards are used for cost control purposes, it seems that these standards need to be attainable and current and in this respect the problems of setting them are similar to the problems encountered in setting quantity standards to be used for cost control.

Who Is Responsible for the Control of Costs?

Because costs must be controlled by individuals it is essential to have both standard and actual costs classified so that individual performance in cost control can be measured. As stated by C. H. Eckelkamp,

> "Cost centers should be established and divided into as many units as are deemed necessary to assure proper control, clearer presentation of data, and placing of individual responsibility. . . . It is axiomatic that responsibility for operating the budgets should be fixed as near as possible to the point of action and placed upon the individual who is charged with the responsibility of the operation and the attendant expenses."[8]

This requires a plan of cost classification which follows the organization structure in order that the costs which each individual can control may be assigned to him. Experience shows that this control is most effective when standards are set in terms of personal responsibility for each cost incurred and actual results are then measured against the respective standards in order that each individual may know how his performance compared with that which was expected of him.

For the purpose of measuring efficiency, only those costs which are direct with respect to a specific function need to be taken into consideration. Many costs which must be allocated in order to determine product costs can be treated as direct charges for purposes of control. For example, if a company produces its own electricity the head of the power plant is responsible for the cost per kilowatt hour. The cost of fuel used to produce power is thus a direct responsibility of the power plant engineer. The other departments determine the amount of power needed and hence are responsible

[8] "An Approach to Budgetary Control," *N. A. C. A. Bulletin*, June 15, 1947, p. 1261.

for the number of kilowatt hours used, but they do not control the cost of fuel consumed in the power plant.

Inclusion of allocated costs in statements prepared primarily for cost control purposes is avoided by some companies in order that departmental executives need review only those costs for which they are held directly responsible. Other companies do show allocated costs in control statements because they consider it desirable to have the departmental executives know the cost of facilities which they use. However, these companies usually separate allocated costs from directly controllable costs in the statements furnished departmental executives.

While cost classification on the basis of controllability is sometimes confused with the classification of costs as fixed or variable, it is a different problem. All costs are controllable by someone in the organization at some time. Costs like depreciation and property taxes are ordinarily considered to be fixed costs, but they are controllable at the management level where decisions to purchase, rent, or dispose of the related assets are made. Hence all costs should appear at some place on some control statements and costs which the departmental executives cannot control are the responsibility of top executives such as the plant superintendent or company officers.

Moreover, control of costs is a matter of timing as well as placing of responsibility. Since any effect which standard costs can have in controlling costs must come before or at the time the costs are incurred, the standards must be applied to the source of the costs. As stated by Verne Breitenbucher,

> "Cost control is concerned with charges at the point of origin. It is inseparably bound to the physical action or condition that generates the charge. Cost must be controlled and consequently reduced at the point where it is incurred."[9]

The exact point at which control may be exercised most effectively depends to a certain extent upon the circumstances in each specific case. Thus in controlling material costs, the price and quality may be best controlled at the time of purchase while control over the quantity consumed must be deferred until the materials are used.

When standards are applied at the source, actual operation costs may be matched with corresponding standard cost and any vari-

[9] "Putting Cost Accounting to Work—For Cost Control," *N. A. C. A. Year Book*, 1946, p. 99.

ance reported to the person responsible as soon as possible. Thus it is not uncommon to find daily reports of labor time, material usage, and other readily controllable costs. The alternative, which is to price production reports and ascertain variances at the end of a month or longer period, provides much weaker control since composite variances are difficult to analyze and the variances will have had a chance to accumulate before the condition is known. However, this method may be expedient for material price and other variances over which day-to-day control is not generally attempted. Costs of long-lived assets can be controlled only when the assets are acquired, but control over the utilization of such assets calls for frequent reports of variances from the normal percentage of operation.

Revision of Control Standards

Control standards must be kept up to date if they are to be accurate measures of the efficiency with which work is being performed. Hence revision seems essential when important changes take place in methods of production, labor efficiency, or material specifications. Changes in price have no effect upon the control of operating efficiency in the plant and it may be unnecessary to revise price standards at the same time. However, to the extent that price standards are used to measure purchasing efficiency or the matching of workers' man rates to the job rates to which they are assigned, price standards must also represent current conditions.

The amount of expense and effort involved in revising standards is quite large when many individual standards are in use. However, changes in the standards for particular components of cost need not always require a complete change all the way through to the finished product standard cost. Normally general changes in labor rates, standard overhead rates, and substantial engineering changes dictate the desirability of completely revising the finished product cost through all of the ramifications of manufactured and purchased components, subassemblies, and major assemblies. However, changes involving only one component through material substitution, minor engineering specification changes, etc. can be accomplished rather simply from a clerical viewpoint by merely changing the standard for that particular component and by writing off variances between the two standards temporarily during the interim periods until a revised finished product cost standard is

established. Through such a device, comparison between actual and revised standard performance is possible without the effort of a complete standard cost change.

Standard Costs for the Control of Fixed Costs

While direct costs can be controlled with unit cost standards and indirect variable costs with flexible budget standards, the control of costs commonly classified as fixed requires standards of still another type. Control of these costs can be exercised in two ways, viz.:

1. By limiting expenditures to those called for by predetermined plans. Obviously this type of control is limited to the time before the expenditures have been made. However, much can be done to keep down fixed charges by carefully planning all additions to plant and by reviewing the need for personnel whose salaries make up part of the fixed charges. This planning will result in a fixed or appropriation type of budget which, in effect, becomes the control standard for expenditures in the fixed charge group.
2. By securing proper utilization of the equipment and organization which the fixed charges represent. After machinery has been purchased or a decision made to maintain an organization of definite size, cost control becomes a matter of keeping these facilities employed at income producing tasks. Hence a standard of utilization is desirable in order that idleness of facilities may be brought to the attention of executives who may be able to prevent its continuance. The standard against which utilization of fixed plant and organization facilities is measured is the percentage of utilization of plant capacity set as normal.

For this purpose "normal" may be defined as a predetermined figure intended to remove from the overhead rate the fluctuations arising from seasonal, cyclical, and random influences. Another way of describing the normal standard is to say that it is set at a level which is expected to average out the ups and downs over a chosen period of time.

Standard Costs For Inventory Costing

Standard Cost vs. Actual Cost

While cost is generally recognized as the primary basis for the statement of inventories in the balance sheet, the historical introduction to this study has pointed out that some accountants use standard cost for inventory costing while others prefer to use actual costs. The difference lies in the concept of what constitutes cost for this purpose.

Thus one group maintains that a proper inventory cost is the planned or standard cost from which have been eliminated expenditures for avoidable waste or inefficiency and for the expense of maintaining idle production facilities.[10] These excess costs are viewed as period costs which should be charged directly against revenues rather than to inventory accounts. As expressed by one writer:

> "Generally, a more realistic profit determination will result if the ending inventory amount has been stated at a value no higher than the manufactured product costs which were planned and used as the base upon which the existing selling prices and policies were established."[11]

The other group maintains that inventory costs should include all costs incurred to manufacture the goods and that standard costs, if used for other purposes, should be adjusted to actual cost before the financial statements are prepared. The following quotation reflects this point of view:

> "Standards do not purport to be costs. . . . Their functions in the cost accounting system are to provide a convenient and flexible means of computing actual costs, inventories, and cost of sales, and to determine the extent of, and reasons for, variations of actual costs from expected results."[12]

The statement of inventories at standard cost will, of course, affect the period-by-period profit figures when a substantial portion of the actual cost is charged against income of the current period through the closing of variance balances to cost of sales or other

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[10] Discussions of this topic rarely mention variance gains, probably because they are, with the exception of volume variances, relatively unimportant in the aggregate.

[11] H. T. McAnly, "Should Unusual Costs Be Allocated to Period Rather than Product?" *The Journal of Accountancy*, May 1947, p. 432-33.

[12] Cyril F. Gamber, "The Relationship Between Standard and Actual Costs," *N. A. C. A. Bulletin*, April 1, 1946, p. 675.

profit and loss accounts. This effect will be most marked when sales and production do not move closely together. However, revision of standard costs may cancel out the effect of writing off variances.

It may be noted that for the purpose of inventory costing, accounting for variances is primarily a matter of their proper disposal. The question of how or why they arose is important only when it affects the decision as to whether or not the variance is to be included in the figure used for inventory costing. This is exactly the opposite of the cost control problem, for there attention is centered upon the origin and cause of the variances while their ultimate disposal is not in question.

Kind of Standard Most Useful for Inventory Costing

When the standard costs are to be used for costing inventories, the standards need to be current and reasonably attainable. When there is a substantial difference between standard and actual cost of the inventories, adjustment may be required unless there is definite justification for the difference. Thus in speaking of the use of standard costs in the postwar period one public accountant has said:

> "More frequent adjustments of standard costs must be made to meet our widely fluctuating operating conditions. The independent auditor must make sure that standard costs used for financial statements are soundly conceived and have been adjusted to represent current standards."[13]

Standards which are so tight as to be beyond currently obtainable performance cause large unfavorable variances to arise. When these are treated as period costs the inventories will not contain the full amount of manufacturing cost which is necessary for production of the goods represented by the inventory figures with the result that inventories are understated. On the other hand, a standard which is too loose will permit excess costs of waste, inefficiency, and idleness to be carried into the inventory.

A standard based on normal capacity would appear to be useful in costing the overhead element of cost in inventories because it tends to average out volume fluctuations. Where these volume fluctuations follow a fairly stable pattern so they can be predicted

[13] J. Harold Stewart, "Developments in Cost Accounting During the War as They Affect the Auditor," in *New Developments in Accounting*, American Institute of Accountants, 1946, p. 49.

in advance, as do seasonal variations, a normal standard rate can be set which will accomplish this aim. However, the longer term cyclical fluctuations in volume often have no discernable periodic variation and substantial under- and overabsorbed balances may still arise.

It would seem that the same current standards based on attainable good performance are ordinarily suitable for both cost control and inventory costing, although many accountants will insist that for the latter purpose the standard costs must not only be attainable but also attained by actual performance without large deviations.

Application of Standard Costs for Inventory Costing

Ordinarily goods completed are charged to finished goods inventory account at the standard unit cost. This costing operation is performed as the goods are completed and transferred if a perpetual inventory account is kept, or at the time the physical inventory is taken if no perpetual inventory is kept. The credits to finished goods inventory and corresponding charges to cost of sales are likewise at standard cost.

Inventories of work in process at the end of the period are also costed at standard, although the time at which the standard costs are introduced into the accounts varies under different accounting plans. Thus, for example, debits to work in process account for material and labor may be for either the standard or the actual cost of these elements used, and debits for overhead may be for the standard cost of either standard or actual hours used. It is also common practice to charge work in process with the standard cost of some items and with the actual cost of other items. Thus variances may be separated at different points as the goods move through the factory. Any variances which have not been previously separated will appear when the work in process account is credited for the standard cost of goods finished or when the physical inventory is taken at the end of the period.

Raw materials may be carried at standard cost, the incoming materials usually being priced at standard cost and the price variance separated before the materials are charged to inventory. Under an alternative practice the materials inventory may be kept at actual cost and the price variance separated when materials are issued for use.

In actual practice it is found that partial applications of stand-

ard costs are rather frequently used for costing inventories. For example, inventories may contain actual cost of materials and standard cost of labor and overhead.

Variances developed through the application of standard costs for inventory costing are usually totals only since the more detailed information used for day-by-day cost control is commonly obtained directly by summary of the requisitions, scrap tickets, operations time cards, etc. Thus in a recent discussion of the subject, Harry E. Howell has said:

> "It would seem that the variance accounts recorded on the books would not be set up so as to draw off shop control reports because that would already have been done at the source. Instead the accounts should be set up to facilitate more accurate disposal of the variances, to disclose the effect of them in the financial statements, and to prepare long-term trend reports for top management guidance."[14]

Revision of Standard Costs for Inventory Costing

It has been stated above that standard costs for inventory valuation need to be current standards in order that inventories may reflect price and efficiency levels prevailing at the balance sheet date. Hence standard costs will need revision whenever cost-affecting changes of substantial amount take place. The following statement illustrates this point of view:

> "If a company does not change its standards very often I think it would be very sound to reflect in this year-end inventory valuation some adjustments indicating the variance between actual experience during the year and the standards set up. However, if you change your standards frequently as we do in our company (we change them once a year), and the new standards really reflect the economies that have transpired during the year, then we believe that no further adjustment is needed in the new standards since they already reflect cost reductions or cost increases, as the case may be."[15]

When standard costs are not revised often enough to represent current price and usage rates, it will likely be necessary to adjust inventories from standard cost to approximate actual cost. The standard costs thus serve as a starting point from which to com-

[14] *Contemporary Accounting*, Thomas W. Leland, ed., American Institute of Accountants, 1945, Chapter 17, p. 7.
[15] Thomas H. Patterson, *N. A. C. A. Year Book*, 1941, p. 117.

pute actual costs by the use of ratios reflecting the differences between actual and standard cost of material, labor, and overhead. When it is desired to state inventories at actual cost, the use of standard costs in such a manner may still facilitate the bookkeeping processes by eliminating a certain amount of detailed tracing of costs.

Standard Costs for Budgetary Planning

Relationship Between Standard Costs and Budgets

It has already been pointed out that budgets and standard costs are similar in that they both are based upon the idea of predetermining the results and using comparison of actual performance with planned performance to measure progress toward the predetermined goal. When standard costs are used the budget is largely a summary of standards for all items of income and expense.

The Place of Standard Costs in Budgeting

The budgetary plan is expressed in a forecasted profit and loss statement and costs are needed in the development of this statement. In considering the cost side of the budget, it is necessary to determine the volume of production and sales and the probable cost of the things needed to produce the volume of goods called for in the budget.

Standard costs are especially valuable for this purpose because they provide a reliable and convenient source of data for converting the budgeted production schedule into requirements for raw material, labor, and services. The reliability of standard costs stems from the fact that they have been based upon careful studies of material usage requirements, operation methods and times, variability of cost with volume, and the best arrangement of equipment. Furthermore the standards have been tested and performance under them has been recorded so there is a good basis for predicting what performance can be expected in the future. On the other hand, past actual costs used alone usually reflect many temporary or random influences so that it is difficult to predict the future behavior of unstandardized costs.

Standard costs are more convenient than actual costs for budget preparation because the standard costs of operations and products are readily built up into total costs for any volume and mixture of products called for by the budget. When actual costs are used for such purposes a great deal of analysis and adjustment will usually

be required. This is likely to be true particularly when the budget calls for extensive changes in product volume or product mixture.

The Use of Standards for Budgeting

The costs to be used for budgeting should reflect:

1. The prices which are expected to prevail during the budget period for material, labor, and services.
2. The efficiencies which can be expected in the use of material, the application of labor, and the utilization of facilities and services.
3. The influence of volume or rate of activity on costs.

It is, however, well known that when standard costs are used for cost control and for inventory costing variances will arise because actual costs cannot be kept exactly in line with standard costs. Hence in preparing the budget it will generally be necessary to forecast the variances which may arise during the forthcoming budget period. The amounts of the several variances thus anticipated will depend upon the specific standards used in preparing the budget. Where both standards and budget are based upon an assumption of attainable performance and where the standards are current, these variances are likely to be relatively small. On the other hand, if operating standards are very tight, if standard costs do not reflect current price levels, or if the volume of production will differ considerably from normal, then it is important to estimate the variances in order that the budget may give a realistic picture of expected operations.

Thus, when the standard costs do not provide exactly the costs needed for budgeting purposes, the forecast of variances provides a means whereby the standards can be utilized in preparing the budget without losing sight of the difference between standard costs and cost actually expected in the budget period.

Standard Costs for Pricing

Pricing is a matter of choosing the most advantageous course from among a range of possible alternatives. Furthermore, selling price and cost are each cause and effect of the other. The selling price per unit affects the number of units that can be sold and the resulting volume affects both the cost and the investment in production facilities. Hence it is necessary to select the best combinations of price, volume, and product mix and the selection may differ according to the length of time it is to remain in effect.

Advantages of Standard Costs for Pricing

Standard costs are ordinarily more easily adjusted and projected into the future than are past actual costs for the following reasons:

1. Standard costs are based upon carefully determined usages of material and labor and thus are free from accidental distortions caused by excess spoilage, reoperations, etc. To the extent that these latter items are avoidable by competitors, they are probably not recoverable in selling price.
2. Adjustments to make standard costs reflect changes in material prices or labor rates are easily made. These adjustment can be made at any time, while standard costs entered on the books and used for inventory costing and for cost control can remain unchanged until the end of the year.
3. Standard overhead rates are based upon a normal activity level and thus provide an acceptable basis for prices which will provide for full recovery of overhead costs in the long run. Actual unit overhead cost at any given time may be so influenced by temporary volume fluctuations as to make actual cost entirely unusable for pricing. For short period pricing decisions the flexible budget standards provide data regarding variability of overhead with volume of activity. From these standards it is possible to secure an estimate of marginal costs which cannot be had by using historical data.
4. For pricing purposes, management needs to know the complete cost of manufacturing and marketing its products. Relatively few companies find it practical to assign marketing costs to products by regular bookkeeping methods, but standard costs can be set for marketing activities.

Factory costs for pricing must be in terms of product units rather than in terms of operations and in this respect pricing standards are more like standards for inventory costing than standards for cost control. While the determination of product unit standard costs for inventory costing sometimes raises difficult problems of applying indirect and joint factory costs to products, these problems are likely to be even more serious in the development of pricing standards. The reason for this is that an arbitrary division of

joint costs can be quite satisfactory for inventory costing but not usable for price decisions. When such difficulties are encountered, complete product unit costs may not be obtainable and management must think in terms of securing the return of these joint costs in total out of the margin between aggregate sales revenues and the sum of all product costs.

Standard Costs for Long-Run Pricing

The objective of long period price policy is to set prices on the company's products which will return all expenses of carrying on the business plus a reasonable return to the owners. The principal problems in developing such costs are centered around the method of recovering fixed costs in the selling prices of individual products. Unit cost standards which reflect fixed cost at normal volume will be the most useful for the purpose. By use of such standards, a cost is obtained which spreads the fixed costs evenly over the units of product made during a relatively long period with the result that the short-term variations in average unit cost are smoothed out. While short-run considerations may require deviations from prices based on long-run cost, the long period cost figure does serve as a guide which indicates the average prices which must be secured over a period of years in order to recover the company's investment in durable assets and continuing expenses for maintaining an organization ready to produce goods.

Standard Costs for Short-Run Pricing

When attention is shifted from long to short period pricing, the variable costs of production then become more significant than the fixed costs. The objective of short-run price policy must be to cover the variable costs and to obtain, in addition, as large a contribution to fixed costs and profits as market conditions at the time will allow. This usually means that there will be periods when prices return all costs and yield a substantial profit besides and also periods of depression when the company must accept prices on some products which return something less than all fixed costs.

For such problems in pricing it is necessary to have the clearest possible separation of fixed and variable costs in order that management may know how much costs will be increased by accepting a given order, or how much cost can be saved by declining the order. The flexible budget standards will be especially useful here because from them can be obtained an estimate of the variation in

overhead cost which can be expected to accompany changes in volume of production.

Again it appears essential that standards be up to date and representative of current material prices, current labor rates, and attainable performance efficiency. As stated by George C. Lyon,

> "Where the cost department has the heavy responsibility for making prices, or for furnishing information on which prices are made, it is of the utmost importance that the standards used are not only correctly derived but that they reflect a practical goal rather than the ideal performance. . . . It makes a rather unfavorable impression on management to contend that certain standards must be attained because time study and engineered standards prove they can be made, when the actual results in terms of profit or loss demonstrate plainly that the ideal standards have never been attained and that a price based on those standards does not produce a profit."[16]

When standard costs are below actual current costs, prices may be set which fail to return the full outlay necessary to produce goods to fill the orders. On the other hand, standards which allow inclusion of avoidable waste in cost or which do not reflect realized cost reductions may handicap the sales department in securing its share of the market.

As all of the costs must be recovered out of the sales revenues, the costs required for pricing will not be limited to the costs included in inventories. For example, the costs of selling and general administration are part of the total cost but are not usually included in inventories. There may also be manufacturing costs which are not charged to inventories but included in costs used to guide the pricing of products. An example of this latter class of costs might be depreciation on assets which have been fully depreciated but which are still serviceable and in use.

Standard Costs to Facilitate Bookkeeping

How Standard Costs Can Save Clerical Expense

The use of standard costs can often save clerical expense by eliminating the detailed record keeping which is necessary when actual costs are used alone. The principal points at which standard

[16] "A Standard Cost Application in the Textile Industry," *N. A. C. A. Bulletin*, Aug. 1, 1946, p. 1140.

costs can be applied to reduce clerical expense may be listed as follows:

1. By carrying inventories at standard cost, stock ledgers can be kept in terms of quantities only. This eliminates much clerical effort in pricing and balancing items on stock ledger cards. Total standard cost of goods on hand can readily be obtained at any time by multiplying the quantity in stock by the standard unit cost. If average actual cost is wanted, it can be computed by multiplying standard cost by the ratio between actual and standard cost of the goods.
2. When standard costs are used, requisitions or bills of material for materials to be put into production can be written and priced more rapidly than when the goods must be priced at actual cost.
3. The standard cost of goods finished can be obtained immediately upon completion since it is necessary only to multiply the quantity by the unit standard cost. Simple and economical process costing methods can be used in place of elaborate job costing methods.
4. The time required to prepare reports which are used by management can be reduced. Since most reports are useful in proportion to their timeliness, the managerial value of accounting is considerably enhanced.
5. The time devoted by management to study and interpretation of cost reports is much reduced when standard costs are used. These economies result from elimination of all details except those requiring attention and from the provision of standard figures which facilitate comparison and interpretation of actual costs.
6. The time required to assemble cost data for budget preparation or pricing studies is reduced because it is not necessary to devote so much time to the analysis and rearrangement of past actual costs.

Application of Standard Costs in Record Keeping

The stability of the standards is of particular importance for record keeping economy, for changes in standards require time-consuming adjustments. When the application of standard costs is limited to those uses which produce economies in record keeping,

the level at which the standard costs are set is relatively unimportant.

If the advantages of saving pricing calculations and the related postings in materials stock ledgers are to be secured, the standards must be applied upon entry of the materials in inventory records. On the other hand, if standard costs are to be used only to facilitate costing of finished goods inventories, the standards need not be applied until credits are entered in the work in process account.

Reconciliation of Conflicts in Development and Application of Standard Costs for Different Purposes

The Problem of Conflicts

In outlining the problems involved in developing and applying standard costs for each of the various uses of cost data, it will be noted that different types of standard costs were found to be needed for different purposes. Furthermore, in practice the standard costs are applied at different points in the bookkeeping process and handled in different ways.

It is obviously impractical to have different sets of standard costs for each purpose. Hence the remainder of this study is devoted to a discussion of possible ways of reconciling the conflicts.

Differences in Application of Standard Costs

Some firms incorporate standard costs into their accounts whereas others maintain them only for statistical comparisons without their incorporation into the double-entry system of cost records. When not incorporated, the standard costs may be used for the purposes of cost control, pricing, and budgeting, but they are not ordinarily used for inventory costing. Moreover, the advantages flowing from the saving of clerical effort in bookkeeping cannot be obtained, although cost control reports can still be constructed according to the principle of exceptions.

Even when the standard costs are entered on the books the standards may be applied at various points in the accounting cycle. The two principal points are (1) when the costs are incurred—i.e., at the time charges are made to work in process account or to records which are subsidiary to this account, and (2) when goods are completed—i.e., at the time work in process account is credited with finished production. An additional variation occurs with materials, for here the price standard may also be applied when the materials are charged to raw materials inventory account.

By the first method listed above, the standards are applied at the source of the cost. Variances are here developed currently as the operations take place and in detail. By the second method, the standards are applied in costing completed work. Variances are usually in the form of a total by orders, processes, or periods. While they may be obtainable by elements of cost, they usually must be analyzed before they can be traced by causes, departments, or operations. For this reason, the method is less effective for cost control than is the first method which permits development of variances by operations as the work progresses.

Conflicts in Kind of Standards Used

The consideration of conflicts between different kinds of standard costs may be approached by considering first the purposes which usually cause standards to be incorporated into the accounts, since the modification of standard costs to serve varying purposes is most difficult when the standards are tied into the system of accounts. These purposes are the control of costs and the costing of inventories. Standard costs need not be entered on the books when used solely for budgeting or pricing.

For both inventory costing and the control of costs, the need is for current standards at an attainable level of efficient production insofar as direct costs are concerned. Hence the same standards can usually serve both purposes. With respect to overhead, the control standards are found in the flexible budget while the inventory costing standard is the normal overhead rate since cost control requires controllable cost at actual volume of activity and inventory costing calls for total overhead at normal capacity volume. However, these are related if the normal rate is derived by dividing the units of production at normal into the total overhead budgeted for this level of activity. Under these circumstances there would again seem to be no problem. With the same set of standard costs acceptable for both of these purposes, cost control reports can be drawn directly from the books and the same standard costs can be used for inventory costing.

When the standard costs in effect for cost control purposes are considered unsatisfactory for inventory costing, the problem can often be resolved by devising a variance disposal procedure which yields inventory costs of the desired type. As one writer has remarked, ". . . the inventory may be adjusted at any time to reflect those elements of cost fluctuations which created the variance. The

problem is no different than that created in an actual cost system by a sudden drop in market prices, in which event inventories carried on the books at so-called actual cost must be adjusted to the lower of cost or market by the application of write-downs or reserves."[17]

In general, the first use made of variances is to keep management informed regarding performance efficiency. Their use for this purpose is not affected by the disposal made of the variances in the accounts. Thus some companies prefer not to use standard costs at all in their financial statements and therefore divide the variances between inventories and cost of sales in order to state inventories at approximate actual cost. Others use actual price combined with standard quantities and standard burden. With any of these methods of variance disposal, the variances can still be used for cost control purposes and the advantages of using standard costs in the books to facilitate the bookkeeping process can be retained while at the same time approximate actual costs are available for stating inventories on the balance sheet.

While it would seem that the same standard costs can be used equally well for both inventory costing and cost control, problems may develop in the practical operation of a standard cost system. For example, price standards may have little or no control value and hence they may not be revised as often as necessary to provide satisfactory inventory costs. Or, a large volume variation gain may raise doubts concerning the desirability of crediting the entire variance to income when substantial inventories of manufactured goods are on hand. When such conditions occur, consideration should first be given to the desirability of revising the standards. If standard costs are revised, the year-end inventories can then be shown at the new standards. So long as a set of standard costs is to serve two purposes, both purposes must be kept in mind continuously in deciding when revisions should be made. On the other hand, revision of standard costs requires adjustment of the records and tends to reduce the bookkeeping economies derived from standard costs. Hence, the frequency with which standards entered on the books are revised must be a compromise between the need for keeping the standards current and the expense required to set new standards and to adjust the records.

Another problem may arise in connection with overhead costs.

[17] Cyril F. Gamber, "The Relationship Between Standard and Actual Costs," *N. A. C. A. Bulletin*, April 1, 1946, p. 677.

Since a number of overhead costs which are commonly included in inventories are not controllable within the comparatively short periods for which operating budgets are generally prepared, the content of the control budget is likely to differ somewhat from that of the budget used to develop overhead rates for inventory costing. Thus prorated fixed charges and variable costs which are not controllable by operating personnel may be omitted from the budgets used for cost control purposes but included in the standard overhead rate used to cost production. In other instances costs such as major repairs which occur irregularly are placed in the control budget of the period in which the work is done, while for inventory costing purposes the same costs are spread over the periods which benefit but in which no expenditures are made.

Cost control requires application of standard costs as closely as possible to the point of origin of the costs to be controlled. For good control it will therefore be desirable to apply the standard to each operation and to obtain and report the variances at frequent intervals. For inventory costing, the standard costs are not needed until manufacturing costs for the period are summarized. The same is true for pricing purposes where only total product costs are needed. However, application of standard costs at the source does not stand in the way of subsequent use of the same standard costs for other purposes since the standard operation costs can be summarized by products for inventory costing purposes.

If the standard costs are to be used for inventory costing but not in a program of detailed operation cost control, maximum advantage from the standpoint of bookkeeping simplification may be secured by deferring application of the standards until the inventories are costed. A combination of methods is sometimes found advantageous. Thus one company applies its material standards at the end of the production process and obtains a total material cost variance which is analyzed only occasionally. On the other hand, actual labor costs are compared with standards at the source and daily variance reports are prepared. The reason underlying this combination of methods is that material is a relatively unimportant portion of the total product cost at this particular company so the standard cost is applied to material principally for costing. Labor is the principal element in product cost, with the result that standard costs are applied in detail to control labor costs.

The use of standards for cost control may advantageously be applied to marketing and administration activities as well as to

manufacturing. Since marketing and administration costs are not included in inventories, these standards are not used for inventory costing purposes.

The necessity for converting material usage, labor, and machine time standards into cost standards is sometimes questioned. The following statement represents this point of view:

> ". . . if we control the time and material we control the cost . . . if we control the time and quantity we can be contented to allow the cost to be whatever it may."[18]

On the other hand, there are advantages to be gained by converting physical standards into cost standards and entering these on the books.

These advantages are:

1. Where the relative importance of variances is not known in terms of cost, expensive time may be wasted to save cheap materials or vice versa. Or much effort may be applied to reducing variances that represent insignificant costs when more important ones are neglected.
2. Executives above the shop foreman level must use summarized data to keep informed. Cost furnishes a basis upon which all operations can be reduced to comparable terms and summarized in reports that are understandable even by those who are not familiar with the detailed operations underlying them.
3. Physical standards have no usefulness for such purposes as inventory costing and pricing, but cost standards are distinctly useful for these other purposes as well as for cost control.
4. Physical standards cannot be used to study the gross profit by classes of products, customers, or marketing operations.

This is not to say that physical standards should not be used where they are superior to cost standards for the purpose. Possibly the use of cost standards has even been carried too far in their application for cost control at the shop foreman's level. Thus one writer has said that:

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[18] Arthur Lazarus, "Standard Costs," *The Journal of Accountancy*, April 1923, p. 251.

"The most effective plans for cost control are those which are direct and simple and which permit performance to be measured on the spot by a visual check. . . .

"Types of budgets which provide visual control are those expressed in terms of physical units. . . . This is true whether the cost system is operated on the basis of the various types of standard costs or on an actual cost basis. In most instances, however, physical standards are converted into dollar values, and control in the shop is effected on a financial basis. On the other hand, there are some organizations that do use the standards or estimates which are established in physical terms for the purpose of factory cost control. This latter method is, of course, the most direct and should be the most effective for shop control purposes."[19]

Standard costs which are to be used only for budget preparation or for pricing need not be entered on the books. However, standards for budgeting and pricing are not entirely unrelated to the book standards, but are commonly derived from the latter by making appropriate allowances. When it is desired to retain the present book standard costs for inventory costing and cost control, the effect of the allowances can be shown in the budget by including a forecast of variances.

On the other hand, it may be considered best to revise the book standards to reflect the changes anticipated. In this event new standard costs will be prepared and entered on the books. Thus the same standards used in preparing the budget will also be used for costing inventories and for cost control and a forecast of variances need not be made.

Standards for short-run pricing need to be kept in line with current material prices, wage rates, and labor efficiency since most companies prefer to base their prices on costs which they actually expect to incur. Long-run standards should be revised when changes in methods or equipment bring permanent alterations in cost. In industries where goods are made on a special order basis, it is necessary to estimate costs for pricing each job according to the specifications of the product. The book standards will supply standard data which can readily be adjusted as desired without conflicting with the use of standards incorporated into the books for other purposes.

[19] David B. Caminez, "Controlling Costs with Physical Unit Budgets," *N. A. C. A. Year Book*, 1944, pp. 148-49.

For all purposes, the usefulness of standard costs will be much influenced by the care with which they have been set and maintained. Many instances of failure to use them and of management's expression of a desire for actual costs rather than standard costs reflects a lack of confidence in the standards. If they are known to be merely guesses, to be set at an unrealistic level, or out of date, management may justifiably question their reliability and doubt the wisdom of spending money on them.

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